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Color Micro Journal™

The Color Computer Monthly Magazine

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THIS 'N THAT

OS-9 Users Group

An **ACTIVE** and **ORGANIZED** Users Group provides a tremendous boost to any product, and we are extremely pleased to see that the **OS-9 Users Group** has all of the features normally found in the more successful Users Groups across the country. It has the **FULL** and **ACTIVE** support of the producer of the product, in this case, **Microware Systems Corp.**; it has a centralized meeting location in conjunction with the annual **OS-9 Seminar** sponsored by **Microware**; and it is a well organized Group with strong and well known leadership in people like Pres. **Dale Puckett** (who writes the **KISSable OS-9** Column in **Rainbow Magazine**) and Vice Pres. **Peter Dibble** (who writes the **OS-9 Users Notes** Column in '68' **Micro Journal Magazine**), to mention a couple that you are probably familiar with.

The **OS-9 Users Group** publishes a Newsletter, and the Software Library is now on-line. Initial plans are to provide a "standard selection" of Software to each New Member, while other Programs will be available for a nominal fee or in exchange for further Library Submissions. An active Users Group can play a large part in developing "Standards" within the Industry, as well as providing a fertile base for rapid but controlled expansion and growth within that Industry.

One problem I hope the **OS-9 Users Group** can eliminate or control is the wide variety of "DEFS" Files floating around the **OS-9** Community; I presently have over 25 DIFFERENT "DEFS" Files on three different Computer Systems with **OS-9** Op Systems. If I try to assemble

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OS-9 TIPS

Tired of hearing your disk drives step at 30ms when you paid more to get 6ms drives? Relief is just a quick debug session away. Want to split that label away from the instruction and add a new instruction at the label location? Read on, these things and more will be explained in this article.

Unfortunately, the user of **OS9** cannot use any of his existing **FLEX** or **R/S DOS** software with his **OS9** operating system. If you want a challenge, you can dump modules to the printer and try to figure out how all the **OS9** utilities work, like I have been doing.

I am sure by now most **OS9** users have discovered that Tandy has continued the now famous tradition of producing documentation without the aid of proof readers. This makes the challenge twofold, you get to figure out what the documentation is trying to tell you in addition to figuring out how the utilities work. Contrary to what you might have hoped, these two things are not always the same.

A good example of confusing documentation is found in the Getting Started with **OS9** book. Notice the last paragraph on page 14. You are told to remove the "blank disk from Drive 0", the very same blank disk you were told to put in Drive 1 in step 2 at the top of the page. Enough criticism, let's get on with the tips you are reading this article to learn about.

Speed up drive step rate to 6ms:

Although the architecture of **OS9** allows separate step rates for the different drives in your system, the **CCDISK** module does not utilize the step rate field in device descriptors. The **OS9** technical information manual offers good explanations of the device descriptors. My first attempts at setting 6ms step rate involved patching the device descriptors, **D0** and **D1**, for drives 0 and 1.

After stumbling through bad CRCs and other things I found the changed descriptors to have no effect on the step rate. I knew from prior exper-

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COMPUTER OPERATING SYSTEMS

General

Computer Systems have come a long way in the last thirty years. The first Computers required an operator to have a **DETAILED** working knowledge of both electronics AND the Machine Language of the Computer to get it to operate. Now days, if you know the English Language, you can run a Computer. Although the advancements

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REVIEW

the
Complete Personal
Accountant

programmer's notebook
P.O. Box 3470
Chapel Hill, NC 27514
(919) 967-0861

Req. Extended BASIC and at LEAST 16K
Tape - \$74.95; Disk - \$79.95

Named descriptively, The COMPLETE PERSONAL ACCOUNTANT is not just a double entry bookkeeping program, but a group of ten related programs, plus a menu program, that are loaded as needed.

- The 10 Programs are:
- CHART OF ACCOUNTS
 - CHECKBOOK MAINTENANCE
 - CHECKBOOK SEARCH
 - DETAIL BUDGET ANALYSIS
 - SUMMARY BUDGET ANALYSIS
 - NET WORTH/INCOME EXPENSE
 - PAYMENTS CALENDAR
 - APPOINTMENTS CALENDAR
 - MAILING LIST
 - COLOR GRAPH

Although one could set it up for a small business, the system seems to be designed primarily for home use. I say seems because you have to look at the design in order to know. The Standard Chart of Accounts lists home type accounts, but I saw nothing that mentioned specific uses. When I requested a tape, in addition to a

disk, for this review, I also recieved some ad copy which does mention Small Businesses as possible users.

In all fairness I must say that the home which can use this program to capacity is elaborate indeed. The standard chart of accounts has 66 accounts, to which you may add up to 33 more. (You may also delete or change any of the accounts.)

Because the documentation deals with both tape and disk, I first thought that both were included; but, as with many others, you have to choose between them. This may not be too bad, however, as the programs are apparently the same, so the Tape version can be saved to Disk (but you would need to change the File references). Over all, COMPLETE PERSONAL ACCOUNTANT does seem aimed more toward Disk Users.

DOCUMENTATION

The standard sized three ring notebook containing the documentation is nice, but not exceptional. It would be better if the rings were a little larger. For 150 pages, a three quarter inch ring is a little small and binds the pages.

My first impressiion, as I browsed through the extensive documentation, was that it seemed very thorough and well organized. The first dozen pages of "get acquainted" material included; Table of contents, Introduction, Outline of Features, Equipment Comments, and Getting Started. The Getting Started section contains sections on First Time Loading, Media Handling, First Time Processing, Routine Processing, and Error Procedures.

After this opening section, each of

the ten programs that make up the system is treated individually. Each section begins with a map of the Options and Operations. Then comes descriptions of the Options and Operations Menus, Program Loading, Data File Loading, Processing and Saving and, finally, Printing to the Screen or Printer (which, by the way is quickly and easily done at almost any time).

In the appendix are about a page and a half of file descriptions (which are duplicated in several sections) and two and a half pages of tips on Double-Entry Bookkeeping. Sample printouts are included where appropriate. Each program gets an average of eleven pages of instructions. The last section of the Manual is a 6 page Index.

THE PROGRAMS

If nothing else, the COMPLETE PERSONAL ACCOUNTANT is colorful. I have never seen so many CLS(n)'s, etc. Every section has its own opening rainbow, also. A typical working screen is the Checkbook Maintenance screen, which will probably be the one used most. The screen makes use of a "fill in the blanks" format. You fill out a black check positioned on a yellow background, which is surrounded by black bars. The check has green blanks under inverse headings. At the bottom of the screen is a sub-menu in inverse lettering. At the top of the (yellow) screen is a sub-sub-menu on a green bar, with standard black on green lettering.

The COMPLETE PERSONAL ACCOUNTANT is full of bells and whistles (lots of nice 'extras'). This may mean that you have

CoCo POWER
UNLEASH THE POWER IN YOUR CoCo
WITH ONE (OR MORE) OF OUR BOARDS.

WORD-PAK \$139.95

The WORD-PAK is a video board designed to plug into the expansion port of the Color Computer. The board produces an 80 column video display that compares easily with the high priced terminals. Software, included with the board, provides such terminal functions as; erase to end of line, erase to end of screen, home cursor, x-y cursor positioning, etc. and the ability to re-program the display for different screen formats. This last feature is useful in that it allows software, written for other computers (such as the Model I), to be run on the Color Computer. Additional software support includes a Flex patch, which allows the user to run ALL standard Flex software, and an enhanced version of TEXPRO III (text editor/processor).

MEM-PAK \$110.00

16K RAM/ROM expansion board. Expand RAM beyond 64K (using the C-C BUS) or put your programs/utilities in ROM for instant loading. The board utilizes 24 pin, compatible memory devices. (Supplied with 16K RAM).

P-C PAK \$ 79.00

Free up your serial port for communication by adding this fully buffered, Centronics compatible, parallel printer port to your computer. The cartridge can be supplied with an optional real time clock for \$122.95.

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The C-C BUS is an expansion bus which connects to the expansion port of the Color Computer and provides the user with six, software selectable, expansion ports. The bus is completely compatible with any size system and automatically senses system size to prevent contention problems. A unique feature of the C-C BUS is the ability to expand system memory size beyond 64K by adding one (or more) MEM-PAKs to the bus. A typical system might contain a disk controller, a parallel printer cartridge, a 16K RAM board, and a WORD-PAK, all installed and available to the computer.

PROTO-CoCo \$ 10.95 (3/\$20)

Build your own expansion projects on this prototyping board that will mount inside a disk controller case when you're finished. Included is a manual with several expansion ideas.

BARE BOARDS

Save money by building your own. We will supply complete documentation including schematics, layout and parts list.

WORD-PAK BB	\$17.95
C-C BUS BB	\$22.95
P-C PAK BB	\$17.95
MEM-PAK BB	\$14.95

SPECIAL:

To celebrate Color Micro Journal's premier issue, we are offering the C-C BUS and the WORK-PAK at special prices. If you order before September 30, 1983 and you mention that you saw the add in Color Micro Journal, you can purchase the C-C BUS for only \$129.95. Or you can purchase the WORK-PAK for only \$99.95 if you order it with the C-C BUS at the regular price.

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Send check, money order, MASTER-CARD/VISA (include card number, interbank number, expiration date and signature) for total purchase price, plus \$2.50 for shipping and handling (Canadian orders please add \$5.00). New Jersey residents add applicable sales tax.

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with OS-9[™] software tools

Unix[®]-based, multitasking, modular, and versatile: these key features are some of the reasons why more 6809 computer manufacturers have selected OS-9 as their standard operating system than any other. And OS-9 has been put to work by thousands of users in almost every conceivable computer application in business, science, industry, education, and government.

Your operating system should not be a barrier between you and your computer. OS-9 is very friendly and easy to use. Its modular structure makes it easy to customize, plus its comprehensive documentation shows you exactly how to interface it to just about any I/O device.

OS-9's advanced features unleash the performance potential of almost any 6809 computer — large or small. In many respects the OS-9/6809 combination is more powerful than many *minicomputers*!

There are two basic versions of OS-9. Both have the same basic features and capabilities. OS-9 Level One runs on small to medium sized systems having up to 64K memory. The Level Two version runs on medium to large size systems having memory management hardware and up to 1 megabyte of memory, and includes record and file locking for multiuser database applications.

Here are just a few reasons why you should insist on OS-9 for your microcomputer system.

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For more information contact your computer supplier or



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some studying to do before you will be able to use the Program to its capacity (that may go for your own Books, as well), but it also provides a lot of capability.

The first thing you will need to do, if you don't want to use the rather massive Standard Chart of Accounts, is make up your own. In this case, you must KNOW your own Books (or Bookkeeping System), and it is easy to leave out things.

To begin using the **COMPLETE PERSONAL ACCOUNTANT**, you load the Menu Program, which then loads your choice of the ten remaining Programs for use. At the end of each program, when using Disk, the menu program is automatically loaded from the disk so you can make your next selection. With the Tape Program, each Program is ended, and you must CLOAD the Menu if you want it again. You can also LOAD or CLOAD individual programs directly, which is almost a necessity with Tape due to the LONG times involved in searching through the tape for a File when automatic loading.

CAPACITY

All of this activity calls for some 77K of Program space. Of course, this means that only a portion can be in use at any one time, and is the reason the **COMPLETE PERSONAL ACCOUNTANT** is broken down into 10 different Programs (which is a normal procedure, even on the larger Computer Systems, for BASIC Accounting Programs). The Programs use Sequential Files, which eliminates the interactive possibilities of Direct or Random Access with Disk Systems (but is required for Tape Storage), but also provides for more efficient use of Mass Storage Space and faster operation of each function, since the Data must be in memory. It also means that the Programs must be as short as possible, to leave as much room as possible for the Data. When a "work session" is completed for each program selection, the Data for the whole period is Saved as a single complete File.

The Checks Program I received left space for 250 entries in a 32K Computer. A 16K Computer would allow 50 entries, and that number is available only with the Tape version (since the Disk Operating System takes up a good bit of RAM itself). You would need to use shorter periods if this was not enough Checks for a month (for example, use one or two week periods, if needed).

CHART OF ACCOUNTS

The step-by-step nature of the Manual makes it fairly easy to get started using the **COMPLETE PERSONAL ACCOUNTANT**. Instructions clearly explain how to alter the Standard Chart of Accounts for your own use. Account numbers are used, which also helps in the subsequent organization of your Statements.

Once this system is set up, it is saved on the Program Disk (make sure you are using a BACKUP of the Master Disk) for Viewing or Changing, as the case may be. Viewing is done by choosing a Print Statement from the menu. It is not absolutely necessary that you have a printer to use this program, because most of the Print Operations give you the option of

printing to the Printer or to the Screen.

CHECKBOOK MAINTENANCE

This is the usually heart of your Bookkeeping System. One option sets up a file for any new period, be it a year, a month, or a week; your choice. After that you will load this (or any other) file and make additions or changes - or simply browse - as needed. When changes and additions are finished, the updated File is saved again.

The actual entry process goes something like this. From the bottom of the screen, below the above mentioned black check, you choose one of seven options: ADD, CHANGE, DELETE, MENU, NEXT, LAST, SEARCH. This is done with a single keystroke. Assuming you chose ADD, another menu immediately appears above the black check, offering: CHECK or DEPOSIT. Again, only a single keystroke is required. The cursor moves to blank number one. You enter a check or deposit number and <ENTER>. Next, at blank number two you enter an account number - <ENTER>. A sub-account number follows, then a six stroke Date MUST be entered; you can't go on without it. You can use up to 15 characters for a Name or Description (no commas please). Enter any amount under a Million Dollars, and then you are presented with another choice; Tax Deductible or not? If it is, a flag is set.

At this point, two other things happen before you go to the next entry. First, you will see a new balance at the bottom, which is updated with each entry - handy if you're running close. Then, you make a basically identical entry for the opposite account. Debits and credits, remember?

If you made an error during your entry, you would choose CHANGE to make corrections. Also, you may move backward and forward to make changes. This is the ONLY way you can correct errors; no aborts may be done during entry. Once a check is started, ALL the blanks must be filled, and THEN a change can be made (other than using a backspace before entering the data for that line).

DELETE, of course allows you to eliminate any check entry. NEXT and LAST (you always press the first letter of an option) move you forward or backward through the list. With SEARCH you can go directly to any check or deposit number. And, when you are satisfied and the Check entries are finished, MENU takes you back to the Main Program Menu.

With this section of the program you have an effective checkbook balancing routine which marks each check off as you go through your Bank Statement. There are little features that figure service charges, interest or dividend payments, etc., to keep that balance fine tuned.

You can Write Checks either through the Program or on your Printer. Special markers are placed on corresponding entries, and you can even dump your whole checkbook to printer.

There are two kinds of saves on the Checks Menu. A Regular Files save MUST be done after each session, but there is also a Checks Summary save which is used by other programs at period endings, etc.

CHECKBOOK SEARCH

This program has much broader Search power than that in the Checkbook Maintenance Program. Assuming you have all of a years entries on one disk, you can quickly call any period in the whole year for Search. You may just browse through the files, or you may search by check number, deposit number, account number, date, or description. NO Changes may be made with this program; that must be done in Checkbook Maintenance.

DETAIL BUDGET ANALYSIS

This is one time when you will

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Articles submitted for publication should be accompanied by the authors Full Name, Address, Date, and Telephone Number. It is preferred that articles be submitted as a .TXT File on a FLEX Formatted 5 or 8 Inch Disk, or as an ASCII File on a Radio Shack Disk or Tape (a .DAT File). BASIC Programs should be submitted on Disk or Tape in the normal Binary Format.

If articles are submitted on paper, they should be either Typed or Printed Single Spaced with a MAXIMUM Line Length of 4" on normal 8 1/2" x 11" bond or better paper. A good BLACK Ribbon must be used because all paper submitted articles will be photo reproduced. NO hand written articles will be accepted (except required art work which goes with an article). Again, PLEASE use a DARK Ribbon.

All letters to the editor should also comply with the above and MUST bear a signature. Letters of 'gripes' as well as 'praise' are solicited. We attempt to publish all letters to the editor verbatim; however, we reserve the right to reject any submission for lack of 'good taste'. We also reserve the right to define what constitutes 'good taste'.

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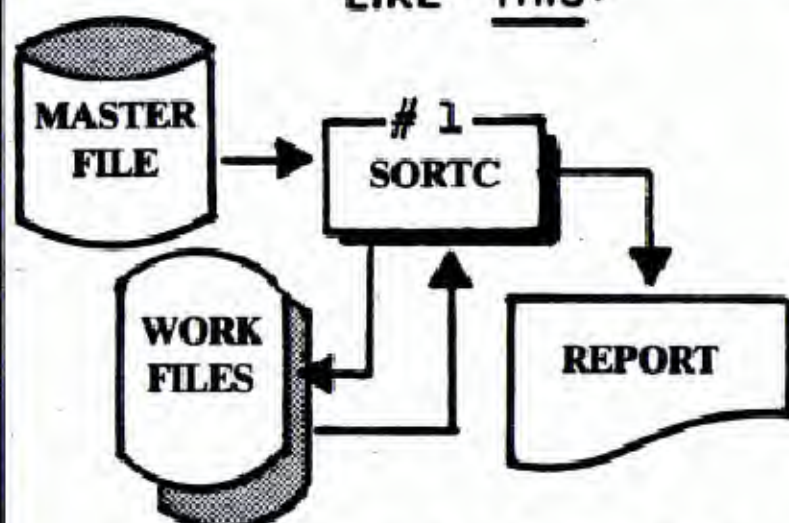
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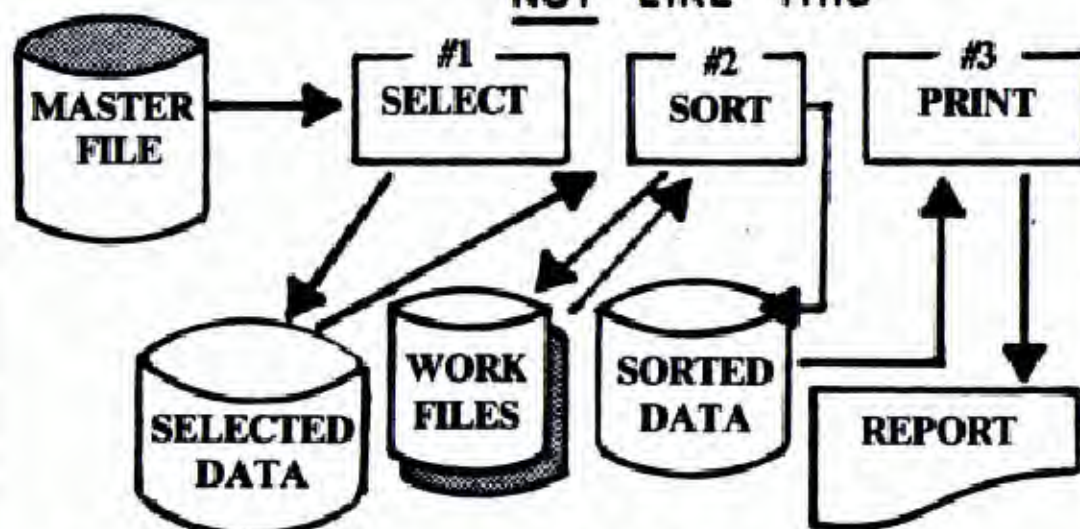
SORTC** for OS9*

THE ONE AND ONLY

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BOLDLY GOING WHERE NO SORT HAS GONE BEFORE

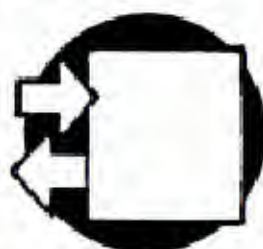
SORTC is a high speed, full-record compounding disk sort, which gives microcomputer users mainframe capabilities. It has been specifically designed to sort data efficiently while offering the user great flexibility in designing sort programs. It is written in BASIC09* for use under OS9.

COMPOUNDING FUNCTION

SORTC has the capability of summing user-specified numeric fields on equality of keys. This allows significant savings in memory, disk space, and program development time. A reduction in the number of disk accesses required when compared to other sorts is inherent in the design of SORTC.

DISK BASED

Specifically designed to sort large volumes of data, SORTC imposes no size restrictions on the amount of data to be sorted. It also places no limits on the number of sort keys which can be used or the order in which the keys are sorted. Furthermore, the sort procedure can be performed as many times as necessary within the same program. This feature allows the programmer to take advantage of any existing data bias, and possibly even reduce the size of the sort key.



JBM'S MIDDLEWARE

*OS9, BASIC09 are registered trademarks of Microware Corporation.

**Uses the same algorithm as JBM's SORTC for Digital Equipment Corp. RSTS Systems.

ADVANCED DESIGN

While most disk sorts are partially based upon the Fibonacci series, SORTC is not. SORTC is a generation ahead of the normal sorts based upon the "Fib series". Its unique algorithm is automatically optimized at run time for a reduction in workspace, reduced # of disk accesses and shorter run times. Designed to be as "crash proof" as possible, the sort procedure will not abort if it is accidentally asked to sort zero items.

EASY TO USE

It is not difficult to design a program which will use JBM's SORTC. Since SORTC is a subroutine, the user may write any procedure he or she wants to format the data for sorting and then to process the sorted data. The sorted data need not be written back to disk, but instead is immediately available. The sort code is automatically inserted into the source procedure by a simple Sort Generator.

ORDERING INFORMATION

SORTC, from JBM's MIDDLEWARE line of quality software, is available on either five and one-quarter or eight inch diskettes for a price of \$150.00. All of JBM's software packages come complete with comprehensive user's manuals.

For more information, or to place an order, contact:

DEPT. FSEA
The JBM Group, Inc.
332 West Church Road
King of Prussia, PA 19406
TEL: 215-337-3138
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surely want a printer. Everything you have done is gone over with a fine-toothed comb. Your Chart of Accounts is loaded to keep everything in place. Your most recent Budget Analysis is loaded, as are your Check Files. Dates, Amounts, and Account Numbers fly thick and fast. You may make additions, changes, searches, and deletions. Finally, a neat, detailed, and well organized analysis is printed to Screen or Printer.

SUMMARY BUDGET ANALYSIS

This is similar to the previous report, but has more of an outline form which looks much like a corporate report. Information comes from Check Summary and Detail Budget Analysis Files.

NET WORTH/INCOME EXPENSE

Information for this statement comes from Summary Files, prior Balances, prior Income Statements, and your Chart of Accounts. In addition to this, you have the opportunity to enter records not involving checking accounts, such as cash expenditures and various receipts not normally routed through checking account deposits. As always, step by step instructions guide you through the process.

CALENDARS

Although not as fast as machine language programs, the Payments Due dates and Appointments can be real conveniences. The computer can remind you who you need to pay or visit, where to go, and when, what job or report must be completed, and so on. The possibilities are almost endless. Lists or Calendar Pages with overall views may be had with the push of a few buttons. You may choose a day or a month from years ahead, assuming that you are that well organized.

MAILING LIST

This, of course, includes an Address List; or rather, Lists. Since your List has a name, and is loaded by name, you can easily have lists for anything you can find a name for. One small but appreciated feature is the two lines available for the address. Both box number and street number can be put on file easily. And when mailing time comes both lines, if used, will be printed.

For simple address finding, it is handy to be able to search for any bit of an Address or Name you can remember. For example, SPR located an address in Spring City, AT located ATKEISON etc. You could even look for AVE or BOB or 15th. You could find Smith by using "th".

When it comes to mailing time you can sort by ZIP, Name (first letter on the line), Address, State, or an Account Number which is available for each address entry; but be prepared to mail to one or all. On the other hand, I suppose separate sub-lists could be made for lists not in either of these extremes.

COLOR GRAPH

If you are visually oriented you will find this one helpful. You can compare

just about any amount for any period you specify, with a total for each type of record selected. Expense, Income, Assets, Liabilities, Check Summaries, and Budget figures can all be compared.

IN PASSING

You will probably have a hard time finding more Program for the money than you get in the **COMPLETE PERSONAL ACCOUNTANT**. There are a lot of twists and turns available; some of the features you may never use, but its nice to have them when needed.

Some of the things go a little slow and might not be best for someone with a heavy data flow; but this Program is not aimed at the BIG users, either. On the other hand, if you have a lot of different kinds of things to keep track of, this could be the System for you. I think of a friend who is a Doctors wife and is into everything, everywhere. She is a capable manager and understands bookkeeping, and could use most of the features of this Program. If you don't get along very well with such things, you may be better off finding a less involved program, as this one requires keeping up with.

Business books were mentioned earlier. How useful it might be would depend on a number of things. My business requires quick and easy retrieval of job oriented information. Few affordable programs can give you that in addition to regular bookkeeping. If your business requires pretty standard bookkeeping at regular intervals, the **COMPLETE PERSONAL ACCOUNTANT** might be just what you need.

This is one of the few Accounting Programs to attempt to use some of the Color Computer's color capabilities. My wife is a mainframe operator, and her first reaction to the heavy use of color on the screen was somewhat negative. I think the main problem is the lack of pastel colors in the CoCo; I found it to be more comfortable after I had turned the Color Level down quite a bit.

There will always be minor complaints; any Program is a matter of trade-offs. In its multi-use nature, the Program Disk must be inserted frequently. There should be prompts for this. Mid-entry abort methods for clutz's like me would be nice. And, I'd like to see it tell you to put a disk in the drive with less than four or five different confusing ways of saying it. You would probably find your own peeves. Oh, what I wouldn't give for the PERFECT Program!

A WORD ON TAPE

The **COMPLETE PERSONAL ACCOUNTANT** works surprising well on tape, all things considered. I did have trouble getting backups of my cassette, perhaps because my system requires a mite more volume than most. But, functionally, it is quite workable once you do that.

If you were to put heavily used programs on short tapes by themselves, you would have a bit of cassette swapping to do, but it would save some long runs to the end of the cassette. And, it would beat spending cash for disk when cash is in short supply.

IN CLOSING

Most of you know this Program as **THE COLOR ACCOUNTANT**. As this review was being finalized for delivery, I learned that the system has been renamed to **COMPLETE PERSONAL ACCOUNTANT** due to the fact that it has been adapted to a number of other computers on the home market. Since that is the name that you will be seeing from now on, I went back and updated the programs name throughout this review.

Jim Lalone

OS-9 TIPS

Continued from page 1

iences with the disk controller that the step rate was set with the two low order bits in the control register along with a disk controller command. The controller command register is at \$FF48. I started searching for code that stored into this address. Using debug and its "S" command, I found CCDISK had multiple references to the control register address.

Working backwards and looking for A or B register loads which would later be stored into \$FF48, I soon found a step command with the low order bits turned on, hex 13. This would step the head at a 30ms rate. I changed this byte to \$10 using debug and exited debug. Imagine my elation when I issued a DCHECK command and heard the drive sound like a real 6ms stepping disk drive. If you have any experience with FAST drives, you know what I am trying to say.

Here is a screen image of the Debug session to change the disk drive step rate to 6ms. Do not do this unless ALL your drives are 6ms drives. The change is in common code which is used on all drives.

OS9: DEBUG
Interactive Debugger

```
DB: L CCDISK      # link module
    BD00 B7
DB: . .+1FE       # dot address change
    BEFE 13
DB: =10           # change $13 to $10
    BEFF 8D
DB: -             # check changed byte
    BEFE 10       # looks okay
DB: Q             # exit debug
```

If you don't see the bytes as shown above, you might have a different version of the operating system. My system master disk is marked version 01.00.00. The addresses might very well be different since the CCDISK module may be loaded on a different page in your system. The data should be the same or the change will probably be invalid for your version of the operating system.

I didn't want to do this every time I booted OS9, so I saved the OS9Boot file to disk, updated the CRC and copied it back to my system disk. I won't go into detail on this, since the section on patching OS9 component modules in the debug section of the Program Development manual tells how to do this.

Some other tidbits:

The DCHECK command has an undocumented option, -D, which shows the set bits in the allocation table.

In addition, the DUMP command has TWO undocumented options which are used when you want printer output. The first is -L, which gives a long line, 16 bytes per line instead of the usual 8 bytes on screen output. You can use this when outputting to the screen but it doesn't look very good. The other option is -H, which gives a printout without the header. This is useful for screen output since more bytes are shown on the screen at a time.

The FORMAT command has a couple of additional options. You may include the volume name when you call the format function. This precludes the wait for entry of volume name before verification begins. Make sure you place double quotes around the volume name. Otherwise

a \$40 will be included in the volume name. The other option, R, will eliminate the prompt for disk insertion. This assumes the disk is in the target drive and ready for formatting. Be careful with this option, unlike R/S disks, the directory for OS9 starts on track zero and will quickly be written over if you make a mistake.

Now for the EDIT macros. The editor at first glance, seems to be not much better than the extended basic editor you have been using. However, the macro facility makes the editor quite powerful. Here are several macros I came up with during my first session with the editor.

TOP is a simple sequence to show the first screenful of lines at the beginning of the file.

```
TOP
VO -S L12
!end of macro
```

SPLT is used to break a line into two pieces. The value of N is the number of words to keep on the first line.

```
SPLT #N
! split line at the Nth blank
VO
[ .SEARCH/ / ] #N
I// C2 K1 - L
!end of macro
```

JOIN will join the current line to the one just before it.

```
JOIN
! join current line to prior line
VO C1 K1 -O L
!end of macro
```

One more item. To go to back to R/S DOS, press reset and when you see the OS9 BOOT message, press reset again and you will be back in Extended Disk Basic.

Hope you enjoy exploring and using OS9 as much as I have.

Jack L. Aker

THIS 'N THAT

Continued from page 1

a Program provided by one of those System Manufacturers, I must go BACK to the "DEFS" Files that were available AT THAT TIME, because the names of the files are different with later Versions of the Operating System. The other option is to list BOTH the OLD and NEW "DEFS" Files, search through the Assembly Listing to see what Calls, etc., are needed, and see if they are included in the NEW one. Obviously, this can be a real project. A second problem is that I have to request over 20K of Memory just to assemble a Device Descriptor (which usually results in about 50 Bytes of Code), because there are now some 750 EQU's, SET's, etc., which have to be loaded to be sure the half dozen needed are there. Hopefully, I "can't see the Trees for the Forest", and someone will come up with a simple solution to this problem, but I'm not holding my breath.

If you are in the least bit interested in OS-9, drop a note to the

OS-9 Users Group

P.O. Box 8027

Des Moines, Iowa 50301

for full information. They, and ALL Users, can use YOUR support, help, ideas, questions, programs, etc. That's what a Users Group is FOR!

Color Computer Shows

The next subject I would like to discuss this month is the different Color Computer Shows that have been held around the country this year. I

don't think ANY Show Sponsor has been happy with the attendance since the first one in Chicago last Fall; I KNOW that VERY FEW of the Exhibitors have been happy with them. I am NOT throwing rocks at any Show Sponsor; I would like to know what YOU, as a Color Computer User, think! Did YOU attend any of the Shows? If so, what did you like and dislike; why did you go; etc.? If you did NOT go to one, WHY not? What would you LIKE to see at a Show? How far would you be willing to travel to go to a Show? In general, what are YOUR thoughts on the subject?

From an EXHIBITORS point of view, we were not very happy with the turn outs at the ones WE attended, and we talked to VERY FEW exhibitors that WERE happy. Most exhibitors are willing to attend a Color Computer Show IF they can BREAK EVEN; very few can afford to LOSE MONEY when attempting to let YOU see their Product FIRST HAND. I know of a couple of planned Color Computer Shows that have already been cancelled because of the history of the last several Shows, and I know of SEVERAL exhibitors who will NOT be attending future Shows (even to the point of forfeiting their deposits, since they will lose less money that way than if they attend the Show). Our personal impression was that Exhibitors with HARDWARE for Sale may have come out OK, but the SOFTWARE suppliers lost a lot of money (you have to sell a LOT of \$40.00 Programs to offset several thousand dollars Show Expense).

We at Computer Publishing have NO intention of sponsoring a Show, so maybe WE can act as a "unbiased information collector". We would like to hear from YOU, both Color Computer

OWNERS and EXHIBITORS. We will collect the information, and provide it to ANYONE who wants it (with Names withheld if so requested). Let us hear from you!

"Let the Buyer Beware"

or

"If the Shoe Fits, Wear It"

I am constantly concerned with the "Mass Marketing" techniques used by Advertisers in the United States, and what it IS doing and HAS done to the Personal Computer Industry over the years. I am also very sorry to KNOW that the same procedures are used within the Color Computer community. We constantly hear from Users who purchased a "Board" that was advertised to work with 16, 32, or 64K Systems, who found out AFTER spending their hard earned money that, first, a Multi-Pak was required (NOT mentioned in the Ad or by the Seller), and, second, that although it would work with any of the Memory Configurations, that was irrelevant, because it only USES 16K (which, in this particular case, severely restricts its capability). Or, from someone who purchased a "Super Fast, Better than Arcade" Game, and then found that it used Low Resolution Graphics for the speed, and only had about 10% of the Arcade Versions capability. Or; etc.

BUT, the Advertiser says (in an example like the Board Purchase), "We would have told him if he had asked." HOW is a purchaser to KNOW WHAT QUESTIONS TO ASK? This is the FIRST Computer that MOST Color Computer Owners have been exposed too; they don't have the Knowledge, Experience,

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and "Computer Sophistication" to be able to "read between the lines" in the Advertisements, or to be aware of the "pitfalls" awaiting them in the Computer Industry. Happily, **MOST** Advertisers and Producers in the Color Computer Industry are aware of the situation, and are **RESPONSIBLE** Organizations that support their products **200%**, and make **EVERY ATTEMPT** to present their products **HONESTLY** in all of their Advertising. It is the **1%** that causes all of the problems. Another factor that must also be mentioned is that the problem may **NOT** be the **PRODUCERS**, but one of their "agents" (Dealer, etc.).

More relevant, how do **YOU** find out what is **GOOD** and what is "not so good"? By reading Advertisements? **THEY** tell you **WHAT** is available; from **WHERE** **I** have been "burned" so many times that if I see a big ad with an eye-catchingly dressed woman, for example, I wonder what the Advertiser is covering up! The Advertiser's problem is; "How do I catch the Readers **ATTENTION** when he is leafing through over a hundred pages of Advertisements in a Magazine?"

You have about four options: 1. Buy the product and learn the hard way; 2. See the product in use by someone else; 3. Buy **ONLY** from those suppliers and **ADVERTISERS** that you have learned

you can **DEPEND** on (usually by method 1. above); or, 4. Depend on Product Reviews published in available Magazines.

Oh yes, there is **ANOTHER** option; **STEAL** a copy of the Program by copying it from a friend. If it is not any good, you are not out anything, so you can throw it away. Only; I'll bet that your **FRIEND** will tell you that it is **NOT** any good, and so you **WON'T** copy it. **BUT**, if he tells you that it **IS** good, do you go out and **BUY** it, so that the producer of that **GOOD** Program will be encouraged to write **SOME MORE GOOD SOFTWARE**? How would **YOU** feel if you had been paid 10% of your normally expected salary for the work that **YOU** did the last 6 to 18 months? That is about how long it takes to write a **DECENT** Program. Think about it!

Option 1 costs a lot of money. Option 2 is the most dependable, but it is usually hard to find a friend with almost any product that you might be interested in. Option 3 should be followed in **ANY** case, no matter **HOW** you learned about a product. Which brings us to Option 4; **REVIEWS**.

Reviews can be a real **BOON** to a Computer User; they can also be the cause of much consternation! **VALID** Reviews are worth more to an Advertiser with a **GOOD** Product than **ANY** amount of Advertising. Conversely,

a **BAD** review can be a Death Sentence. Again, **YOU** will probably have to learn "the hard way" which Magazines and Reviewers you can depend on. You are skeptical of Reviews because you feel that the Magazine is not going to "downgrade" one of their Advertiser's Products with a "bad" Review, taking a chance on losing that income. In some cases, you may be right; I don't know. There are other problems involved, from a publishing standpoint.

Finding **GOOD** Reviewers is a problem; someone who is familiar with that type of product, and who can write about it so that you can learn from it. Obviously, if you know **NOTHING** about accounting, you could not write a decent review of an Accounting Program. Often, **WE** don't get adequate information with the Product from the producer; what type of User is the Product targeted towards, what Computer Configuration is required, etc. We sometimes receive products for review that do not even have pricing information available. The **ADVERTISER** has a lot to do with the quality of the Review of his product. As an additional note, **SOME** Advertisers are extremely "choosy" about where they send Products for Review, **ESPECIALLY** if they have something to hide. Enough said!

I can only state **Color Micro Journal's** position towards Reviews, and let you make you own judgments. The two primary concerns are 1, "What would **YOU** want to know if **YOU** were interested in that Product?", and 2, "Does the Product do what the **ADVERTISEMENTS** say it does?". That is, the Review should fill in the information "between the lines" of the Advertisements, and provide the details of Operation, Strong Points, and the Limitations that the Advertiser can not afford to discuss in an Ad (or those that they would rather sort of "skip over"). The old "Tell it like it **IS**" routine! We also like to include some examples of the use of the Product, where possible. This helps **YOU**, the Reader, learn more about the potential of that Product, and also helps you get a better feel for what is involved in its operation. An example of this type of Review is the one on the **EliteCalc** Program which we ran in the Sept. '83 Issue of **CMJ**.

First, if the Product is "good", there is no real problem except that of finding someone with the experience, Computer configuration, and writing ability to provide a timely review.

If the Product does not work, or the Advertising is mis-leading, then the problems begin. The **PRIMARY** concern of **THIS** publication is the advancement of the Color Computer and its Support Products. The best way to accomplish this is to help you learn how to make greater **USE** of your Computer, and to help you around the "pitfalls" like poor products. **BUT**, we have seen, in six years experience with '68' **Micro Journal**, some **VERY GOOD** products become available that started out as **JUNK**! The major factor that produced a good product was that the **PRODUCER** was sincerely interested in providing a **GOOD** product, and took our reviewers comments as "constructive criticism" and worked from there. Our procedure for a bad review is to get in touch with the producer, and see what happens. Sometimes it turns out that it was a "bad review" of a decent

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Reduced from \$69.29 to \$59.29 for the CoCo disk or cassette version, and from \$178.58 to \$125 for the Flex disk version. (Add \$3 for AMDEK 3" disks.)

HUMBUG-64

Reduced from \$59.95 to \$49.95. This version is specially configured for 64K disk systems using either Flex or STAR-DOS. (Add \$3 for AMDEK 3" disks.)

REBATE

Buy your Star-Kits software from a dealer, and get an extra savings by sending us your registration form and a copy of your sales slip or invoice. The rebate is \$10 on software priced over \$50, and \$5 for software under \$50. The rebate is in effect until December 24, 1983.

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If you have an illegitimate (ahem... pirated) copy of a Star-Kits program, we offer you an amnesty as part of our Illegitimacy Program. Send us (a) a working copy of the program, (b) details on where and from whom you got it (with adequate identification of the source), and (c) 25% of the current list price, and we will send you (a) the latest up-to-date copy of the program, (b) a complete and up-to-date manual, and (c) a sales slip welcoming you to the world of happy Star-Kits customers. A small price to pay for a clear conscience?

MC-10 SPECIAL

To celebrate Star-Kits' being first with MC-10 software, here's our MC-10 Triple-Pak: MC-10 HUMBUG (normally \$29.95), MC-10 REMOTERM (normally \$19.95), and MC-10 COMMTERM (a brand new terminal communications program which sells separately for \$19.95), a total value of \$69.85, all for a special price of just \$55.

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product; if so, we try again with another reviewer. Often the producer is willing to make changes to make it a decent product. If the product needs more work, and they are accomplishing this, we "hang lose", and the Review does not get published. If we even get a SUGGESTION that the producer is trying to hide a bad product with fancy advertising, YOU will HEAR ABOUT IT; ASAP.

It boils down to this; if the Review is published in **Color Micro Journal**, you know what you are getting. If you do NOT see it in **CMJ**, either we do not have it to Review, it is in a "hold pending improvement" state, or it is "in process", meaning either that we are looking for a VALID Reviewer, or that it is now being reviewed.

YES, WE ARE LOOKING FOR REVIEWERS! If you think you would be interested, send me a "review" of something you have as a sample of what you can do, and let me know what your interests are and what your Computer Configuration is (amount of memory, disk, tape, printer, etc.). We would PREFER that you send a "Text" File (DAT File in Radio Shack terminology), either on Tape or Disk, in Radio Shack, FLEX, or OS-9 Format, with NO imbedded Control Codes (just leave a blank line for paragraph separation); and possibly a print-out so we can see how you intended the article to be formatted. Your return as a reviewer will be some new products, which are normally yours to keep, and a small amount of reimbursement (that means "money", y'all) to help defray your expenses.

--- RIN ---

COCO 2 HARDWARE NOTES

HARDWARE NOTES FROM UNDER THE COCO 2 COVER

Radio Shack has introduced a new version of its successful Color Computer. The new Color Computer 2 is fully software compatible with all current Radio Shack software, but third party software and hardware compatibility is another story.

Major design changes have taken place under the COCO 2 cover. To start with, Radio Shack has completely eliminated the 12 volts from the Color Computer 2; it runs almost entirely on +5 volts. The only negative voltage is for the RS232 interface. They have replaced the dynamic 16K chips with 4517 chips. These are 16K counterparts that require only +5 volts. Piggyback upgrades for the older computers will not work here. Other hardware items that will not work "as is" include the RS X-PAD, Eeprom Programmers, Video Interfaces, Microtext, old RS Disk Controllers, and Speech Synthesizers. The COCO 2 power supply is now a simple center-tapped transformer with a fuse hard wired into the primary. Take note that CR7 and CR8 are special diodes that have no direct substitutes. These parts can only be obtained through Radio Shack National Parts.

The most obvious external change is the size of the computer and the keyboard. The COCO 2 is smaller than the older Color Computers, measuring 13 3/4"W X 9 1/2"D X 2 3/4"H. The case is no longer "battle ship gray", but a pleasing off-white. The keyboard is still of the conductive rubber type, but has larger, nicer key caps. This is a disappointment, as I thought it would be changed to the mechanical type. The air vent holes are across the rear top of the cover like the "infamous" TDP computers.

Looking inside reveals more interesting changes. To upgrade to 64K is now as simple as 1-2-3! All one has to do is remove the (8) 4517 chips and replace them with (8) 4164 chips. Between IC chips U6 and U7 is W1. Run a jumper wire across the solder feed through holes to the right where W1 is marked and VIOLA, you now have 64K! No more capacitors or traces to cut and no pins to bend up. Old "D" board owners wish they had it as easy. Looking further reveals the absence of the Astec RF Modulator. This is because the MC1372 Video Mixer chip is now being used as both a Video Mixer and RF Modulator. Due to a new redesign in the VDG circuitry, colors

from Semigraphics 6 mode do not appear. This again has no effect on RS software, only third party software.

All Color Computer 2's have the new 1.2 BASIC ROM and 1.1 Extended Basic ROM. The new Color 2 Disk Drive Kits (26-3029) contains the new 1.1 Disk Rom reconfigured to work with OS-9. The 1.0 Disk ROM's will work with OS-9, but require the cumbersome task of always inserting a boot disk. With the new 1.1 Disk ROM, all you have to do to boot OS-9 is type DOS. OS-9 is a sophisticated operating system with Multi-User and Multi-Tasking capabilities. It requires 64K RAM, but considering the ease of upgrading and the low cost of 64K chips (\$44.95), many COCO 2 owners will soon be exploring the powers of OS-9.

Radio Shack has done some job in bringing in an exciting new COCO product line. Besides the Color 2 and OS-9, there are now Multi-Pak Interfaces, RS-232 Program Paks, Color Mouses, Deluxe Joysticks, Color Ink Jet Printers, and soon to come in 1984 the much rumored "SUPER COCO". We'll leave that one alone for now. You do like surprises don't you?

Bob Rosen

STAR - KIBBITS

My dictionary defines 'deja vu' as the mistaken feeling that you've seen something before, when you really have not. But if you had the feeling last month that you had seen my Kibbits chat before, it wasn't deja vu! You really did see it — the month before that. As you can imagine, writing a new column each month can get somewhat hectic, especially as the deadline approaches... and passes. If this were just a plain article, the magazine could simply put in a note like "Mr. Stark's column will not appear in this issue, and will resume next month." But with an advertisement it's not that simple. I suppose we could have left this space empty...

STAR-DOS PRICE REDUCTION

Our STAR-DOS 64 has had such a good reception that we have decided to permanently drop the price. From now on, the regular STAR-DOS (for 16k and 32k systems) and STAR-DOS 64 (for 64k systems) are being bundled together into a single package which we will call STAR-DOS, and which will have the combined price of \$49.90.

Despite the release of OS-9 (a trademark of Microware Systems Corp.) and Flex (a trademark of Technical Systems Consultants) for the CoCo, we expect the popularity of STAR-DOS to keep rising for two very simple reasons. First, STAR-DOS is the only DOS which supports the standard Radio Shack CoCo disk format. Though we all hear about the large amount of software available for Flex and OS-9, the fact of the matter is that there are more programs available for the standard CoCo disk format than for OS-9 and Flex together.

Second, since OS-9 and Flex are also incompatible with regular CoCo Disk Basic, you must buy another Basic to get their full benefits. Not so for STAR-DOS, which can read and write the same files a Disk Basic can.

There is a good number of serious users of STAR-DOS among you; in fact, we have even licensed STAR-DOS to other software developers for inclusion in their own products. We're so enthusiastic about the future of STAR-DOS that we're willing to make you an offer you can't refuse: If you now have a DOS, any DOS for any machine, send it to us and we will trade you for a copy of STAR-DOS. Please — original documentation and disks only, and include \$3 for shipping.

To know STAR-DOS is to love it!

COMMTERM IS NOW FREE!

COMMTERM is our communications terminal program for the CoCo and MC-10. You can now get it FREE if you send us a cassette and a stamped self-addressed envelope (with three stamps). After you get it and use it, decide what it is worth to you, and then pay us whatever you like. You have our permission to copy the program and documentation as much as you want, and give it away to anyone you like, providing that you don't make any changes to it. It's a new marketing approach, and we're curious to see what happens.

ARE YOU A PRIVATE PILOT?

If so, then you may be interested in a VFR Flight Planning program for the CoCo, available for \$24.95 for tape, or \$29.95 for disk, from Frank Lombardi, P.O. Box 373, South Salem, NY 10590.

That's it for now — see you next month.

SPELL 'N FIX

Regardless of whose text processor you use, let SPELL 'N FIX find and fix your spelling and typing mistakes. It reads text faster than you can, and spots and corrects errors even experienced proofreaders miss. It is compatible with all Color Computer text processors. \$69.29 in the Radio Shack disk or cassette versions; \$178.58 in the Flex version. (20,000 word dictionary is standard, optional 75,000 word Super Dictionary costs \$50 additional.)

HUMBUG® — THE SUPER MONITOR

A complete monitor and debugging system which lets you input programs and data into memory, list memory contents, insert multiple breakpoints, single-step, test, checksum, and compare memory contents, find data in memory, start and stop programs, upload and download, save to tape, connect the Color Computer to a terminal, printer, or remote computer, and more. HUMBUG on disk or cassette costs just \$39.95, special 64K version for FLEX or STAR-DOS 64 costs \$59.95, MC-10 version \$29.95.

STAR-DOS

A Disk Operating System specially designed for the Color Computer, STAR-DOS is fully compatible with your present Color Computer disk format — it reads disks written by Extended Disk Basic and vice versa. STAR-DOS for 16K through 64K systems costs \$49.90.

STAR FLEX

The best implementation of FLEX for the Color Computer. Complete with all utilities, text editor, macro assembler, and HUMBUG debug monitor, \$225.00.

ALL IN ONE — Editor Etc.

Three programs in one — a full function Editor, a Text Processor and a Mailing List/Label program. All this for just \$50. Requires STAR-DOS, or FLEX, specify which.

DBLS for Data Bases

DBLS stands for Data Base Lookup System. A super-fast system for searching for a selected record in a sequential disk file. Supplied with SPELL 'N FIX's 20,000 word dictionary as a sample data file — lets you look up the spelling of any word in under FOUR seconds. Priced at \$29.95. Requires STAR-DOS.

CHECK 'N TAX

Home accounting package combines checkbook maintenance and income tax data collection. Written in Basic for either RS Disk or Flex, \$50.

REMOTERM

REMOTERM — makes your CoCo into a host computer, operated from a remote terminal. \$19.95, disk or cassette.

NEWTALK

NEWTALK — a memory examine utility for machine language programmers which reads out memory contents through the TV set speaker. \$20, disk or cassette.

SHRINK

SHRINK — our version of Eliza, in machine language and extremely fast. \$15, disk or cassette.

EDUCATIONAL SOFTWARE

Introduction to Numerical Methods — college level course on computer math, \$75.00, disk or cassette.

We accept cash, check, COD, Visa, or Master Card. NY State residents please add appropriate sales tax. Add \$3 to above price for AMDEK 3" disk versions.

(FLEX is a trademark of Technical Systems Consultants, Inc. Everything else in this ad is a trademark of Star-Kits.)

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COMPUTER OPERATING SYSTEMS

Continued from page 1

in electronics have produced more powerful Computers for less money, the development of **Computer Operating Systems** has been the real factor in the growth of the Computer Industry.

The earliest Microcomputers had a multitude of switches and lights on the front panel, which the operator used to control the Computer. Some of the switches provided a means for the operator to "Input" information into the Computer, while the lights indicated the "Output" from it. To operate the Computer, the operator turned the machine on and proceeded to insert a program by setting the Input switches, pushing a button to cause that code to be "entered", set the switches to another code, enter that, etc. After an hour or two of setting and entering the switches, he had installed a small program that might read ANOTHER set of switches and perform some function, depending on their settings. He could see if the program worked correctly by reading and decoding the lights. This was all done in BINARY, and required many hours of "programming" to get a simple program installed just to read and react to a particular set of switch settings (consider that several HUNDRED lines of code are involved with the simple BASIC STATEMENT; PRINT "HELLO"). Obviously, this did not lead to "efficient" use of the Computer.

The users of those first Computers were hobbyists whose interests lay primarily in the Digital Electronics area. By entering a program through the switches, they were developing the first rudiments of a **Microcomputer Operating System** (they were developing what we now refer to as a "Monitor" Program; a term used for Programs which allow the User to work DIRECTLY with the Machine Language of the Computer). Since the setting of the switches was extremely time consuming, and had to be accomplished every time the Computer was turned on, a better method of entering the programs and reading the output (i.e., "communicating" with the Computer) was needed.

The next step was to install a 16 or 20 Key Keypad for the Input, and some type of Display, such as the Seven-Segment LED Readouts (such as is used with the Heathkit ET-3400 Micro-processor Trainer). Now, the data could be entered much faster, by entering Hex Data through the Key Pad (with, possibly, a few "special function" keys for GO, ENTER, STOP, SINGLE-STEP, etc.), and the Readout could be displayed directly as Hex Info, eliminating the need to convert from Binary all of the time. This required a Monitor Program which could interpret each Key and install the correct information in the right location in memory, and routines to convert and hold the output to be displayed on the Displays. The user still had to hand code each program in Machine Language, and enter each program from the Key Pad before he could execute it, but this was still

many times faster than setting individual switches.

Progress rapidly moved from those beginnings to Teletype machines which provided a full Keyboard Input and a Printer Output, Mass Storage Systems such as Tape Units so that the program could be saved and reloaded in seconds or minutes instead of hours, on through to the Systems that we have today with Keyboard Input and a CRT or TV Output in "English Language", Disk Systems which allow saving and loading programs in milli-seconds instead of minutes, etc. The lower cost Computer Systems provide the complete Operating System in ROM (Read-Only Memory), while the larger and more flexible Systems provide a small ROM'd Monitor which allows reading the desired Operating System off of Disk when the Computer is first turned on.

Each step forward in "Hardware" development required parallel advancements in the Software (or vice versa). These developments provided a means for the Computer Operator to communicate with the machine in a more and more "natural" manner. As time went on, and experience was gained in using Computer Systems, the Operating Systems became more and more Powerful and "User Friendly", accepting English Language Statements such as "Load", "Save", "Print", etc. This capability made the Computer accessible to more and more users.

More Users led to the development of different Computers, but a Program written for one Computer would not run on another Computer. The need arose for an Operating System that would allow one program to be written that



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could run on several different kinds of Computers. While the **Computer Operator** needed to be able to communicate with the computer in a language HE (or SHE) could understand, the **PROGRAM** also needed a common interface that IT could understand. Over a period of time, a few Operating Systems floated to the top, such that, once it was installed on a Computer, ANY Program that was written to run with that Operating System, and which used the System provided Input/Output locations, would run on ANY Computer that used that Operating System. Some of the well known Operating Systems that evolved are CP/M (in its MANY variations) for the '80 Series CPU's, **FLEX** for the '68 Series CPU's, and now, **OS-9**, a Multi-User, Multi-Tasking Operating System for the 6809.

To get a clearer picture of this concept, imagine that the different States in the U.S. are different Computers; that the Highway System is an Operating System; and that various vehicles (cars, trucks, etc.) are the different Programs. The Highway System is "Standardized"; the roads are at least a certain width, there are no brick walls or large ditches across them, etc. As long as the cars and trucks are built to run on this type of surface, they can be used to go to any State in the U.S. Some are large and some are small, some are built to carry a few people and some are built to carry large loads, but ALL are built to run on the Highway System. The Railway System is a different "Operating System", cars and trucks can not run on it; a different type of vehicle is required to run on this System. Likewise, a Radio Shack Program will not run under FLEX or OS-9, or a FLEX Program will not run under Radio Shack or OS-9, etc., because they are DIFFERENT Operating Systems.

A very basic Operating System, such as that provided by Radio Shack with the Color Computers, will allow the User to functionally control the various systems that are a part of the overall Computer System, such as the Tape System, Printer, Display, Disk System, etc. More powerful Operating Systems provide the User with greater capabilities in the operation and control of the overall Computer System, including User Control of the Input and Output of Programs (rather than being tied down to only what the Program was written to accomplish), on up to providing Multi-User and Multi-Tasking Operations, Real-Time Operating Systems for Industrial Control Systems etc.

As with any engineering project, there are always trade offs. An increase in Operating System capability means that the use of the System will be more complex and that more memory and other items, such as Disk Drives, will be required to handle the added capabilities.

Basically, then, a **Computer Operating System** is a Program, or system of Programs, which provides the Computer System USER with an easy means of communicating with, and controlling, the Computer System itself; and also provides a "Standard" interface for Programs. The Computer Chip only understands combinations of ON and OFF; an Operating System is required to interpret the Users' English Language statement into a form that the Computer can understand. If

you enter **CLOAD "GAME"** on the Color Computer, the Operating System determines that you want to load a Program from the Tape System, then turns on the Tape System, finds the Program on the Tape, gets the information off of the Tape, turns off the Tape System, and lets you know that it has either accomplished the task or run into some problems. It also had to put the information it read from the Tape into the proper place in Memory, in the proper format, and set the Computer System up so that Program could be run. Also, a Programmer can use, for example, the built-in Tape Operation functions, so he does not have to program these features into a Program he is writing to run with this System. Obviously, if we did not have the simple Operating System that Radio Shack provides with the Color Computer, there would not be very many of us that could actually USE the Computer.

Color Computer Operating Systems

There are now three (3) **MAJOR Operating Systems** available for the Radio Shack Color Computer; in order of power, flexibility, and complexity, they are

Radio Shack FLEX OS-9

The Radio Shack Operating System could be broken down into a "Tape-Based" Operating System in the BASIC and Extended BASIC ROM's, and a "Disk-Based" Operating System with the Disk BASIC ROM (Disk Operating Systems are normally referred to as a **DOS**). This Operating System is closely tied to the BASIC Language provided with the Computer.

Both **FLEX** and the Color Computer **OS-9** are **Disk Operating Systems**, and are complete "Stand Alone" Programs in themselves; i.e., they are separate Programs that you load and execute just like you would a Color Computer Game. When they are executed, the normal Radio Shack Operating System and BASIC disappear, and are not usable until you turn the Computer off and turn it back on again. If you want to use the BASIC which runs under FLEX, you must obtain the Program, BASIC (or **KBASIC**), and execute it just like you would a Word Processor or Accounting Program. If you want to use BASIC with OS-9, you must obtain **Basic09**, which is just another Program that runs under OS-9.

The Radio Shack Tape and Disk Operating Systems are obviously the "STANDARD" Operating Systems for the Color Computer, because every Color Computer built contains that Operating System. **FLEX** and **OS-9** are the primary Disk Operating Systems of most of the **6809-Based Business Computer Systems**. **FLEX** has been around the longest, and supports a multitude of good working Software. **OS-9** has been operational about three years, and has exceptionally powerful Software Development software support (Basic09, Pascal, COBOL, C, and a special OS-9 oriented Assembler); some good "Working" Software is now beginning to appear.

The Radio Shack Operating System is the simplest and easiest to use, but has very little user flexibility and power. For example, the only method provided for use of the Printer is through the BASIC Programming Language. For the average Single-User Computer

System in a Home or Business Environment, **FLEX** is unbeatable. It uses a simple, consistent Command Syntax and a Disk Structure that is flexible, yet reliable (and, in most cases, **REPAIRABLE**, should something happen to the Directory). **OS-9** is far and away the most powerful of the 6809 Operating Systems (in fact, it is more Powerful and Easier to Use than most of the 16-Bit Operating Systems available to most of the other Microcomputer Users). Based on the UNIX Operating System, the operator has **TOTAL CONTROL** of the Computer and Programs from the Command Line. While it may appear to be confusing by just reading the Manual, **OS-9** is easy to learn by just setting down at the Computer and working with it a little while. **OS-9's** Disk Directory System provides excellent User flexibility, but a "blown Directory", like the Radio Shack Disk structure, is usually **FATAL** (i.e., non-repairable).

The **Radio Shack Operating System** is ROM Based, providing immediate response to a Command, but the inclusion of the BASIC Programming Language in the ROMs, along with the memory limitations, restrict the capabilities and flexibility of these Commands. The design of the Operating System, coupled with the fact that it is in ROM, severely restricts the flexibility of the System in that it is hard to add "System Commands", or change those that are provided. On the other hand, the Hardware design of the Color Computer, and especially the capabilities of the 6883 SAM Chip, provide a flexibility unheard of in any other Computer System, and allow the easy installation of more powerful Operating Systems. Where else can you get a Computer for about \$300, and expand it as you learn into a full UNIX style Disk Operating System?

The **FLEX Disk Operating System** is a Program which provides much greater User control and flexibility in using the Computer as a working "Tool". **FLEX** is strictly a "Disk Based" Operating System (i.e., it is ONLY used with Disk Systems) which resides in high Memory beginning at \$C000 (the same address as the Color Computers' Cartridge Slot and Disk ROM). This means that to run **FLEX** (or the Color Computer **OS-9**), you **MUST** have **BOTH** 64K of RAM and a Disk System. As was mentioned previously, when **FLEX** (or **OS-9**) is brought up on the Color Computer, all of the Radio Shack System disappears. **FLEX** then provides all of the interface between the User (and most Programs) and the Computer itself.

FLEX has a couple of "built in" Commands, but almost all of the **FLEX** Commands are "Disk Resident"; that is, when a Command is given, it loads it off of the Disk and executes it. **FLEX** provides some space within the Operating System for these Command Programs to load and run so that they will not interfere with a Program that the User may be running, such as BASIC or an Editor or Word Processor. This allows both the User and the Program to use the System Commands (small Programs that perform a "System" function, such as reading a disk directory, list a file, delete a file, etc., are normally called "Utilities") without leaving the Program itself. Also, by having the Commands on Disk, where they are accessible, they can be easily changed, it is easy to add new Commands to the System, memory space is not tied up, etc. **FLEX** allows information in a Disk File to be listed to the Display or Printer to examine its



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Requires 16K Extended Basic. 32K recommended.

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Requires 32K Extended Basic



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Auto Run is a utility program for the TRS-80* Extended Basic Color Computer. It is used to add convenience and professionalism to your software.

Auto Run will help you create your title screen with the graphics editor. The graphics editor allows you to choose a background color and border style. Using the arrow keys and several other commands you can draw pictures, block letters and also include text.

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Requires 16K Extended Basic.

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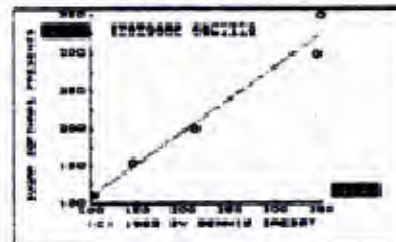
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when purchased without the General FLEX9 Sys.	\$ 59.95
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SPECIAL SYSTEM PACKAGES

64K Radio Shack COLOR COMPUTER, Radio Shack COLOR DISK CONTROLLER, a Disk Drive System, Special General Version of FLEX9, F-MATE(RS), and a Box of 10 Double Density Diskettes, a COMPLETE ready to run SYSTEM on your Color TV Set.

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NO LIMITS! A FULL-BLOOM DISASSEMBLER FOR THE COLOR COMPUTER
Computer Systems Consultants **SUPER SLUTTER** is a "Time Tested", reliable, **POWERFUL** disassembler that has gained acceptance through out the FLEX Community as an extremely **POWERFUL**, **INTERACTIVE**, **SOFTWARE** Tool. Now, this **POWERFUL** disassembler has been converted to run on a **STANDARD IBM Color Computer or TPC-III System with a Disk System**. The **Color SLUTTER** Software Package consists of 3 Programs: **SLUTTER** (the Disassembler), **CHROM** (used to globally change labels to a meaningful name), and **XREF** (a Cross Reference Generator for Source Code Files). **Color SLUTTER** will Disassemble Disk Files of 6800, 6801, 6802, 6803 (the "Baby Code"), 6805, 6806, 6809, and 6802 (Apple, Atari, Commodore, etc.) Object Code if you can get it on a Color Computer Disk. (See Aug. '83 '86' Micro Journal "Color Users Notes" Column for a full Review.)
Color Computer Disk - Object Code Only \$49.00

BASIC Programming Language
Business Electronics POWER - Intrigued by Fortran? Here is a forth package tailored to the Color Computer. This package is supplied on Tape, with instructions for transferring it to disk if you wish. Written primarily in machine language, it's speed is unparalleled. A full Semigraphic-8 Editor is provided, along with "goodies" like Graphics and Sound Commands, Printer Commands, Auto-Save and Control Keys, etc. If you are interested in learning Fortran, a Trace Feature is provided which is invaluable. If you are a **POWER** Pro, this package provides **ON** carry flag accessibility, Fast Task Multiplexing, Clean Interrupt Handling, etc. (Or you won't "out grow" the basic capabilities of this implementation). Combine this package with Leo Brodie's **EXCELLENT** book "Starting FORTH", and you will be a **POWER** Expert before you know it (and have a lot of fun doing it!).
Color Computer **TAPES** (w/ instructions for transferring to disk) \$58.95

Color Computer GRAPHIC SCREEN SPEED Program
Dump any "PAGE" Screen to the Printer with the BASIC **US** Function. Shift the Printout Left or Right or Reverse Print (Dark for Light Screen and Vice Versa). All Programs on Tape.
OS9 for Radio Shack LP-VII/VIII & IBM 186/286/486 Printers \$7.95
OS9 for Epson w/ Graphics and Graphics + Printers \$9.95
OS9 for Gemini 16 and 15 Printers \$9.95
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DATE-O-BASE CALENDAR Program
A Menu Driven **EXTENDED BASIC** Program which allows the entry of up to 12 Names per Day, each of which may contain up to 28 Characters, for any day of the Month between the years 1788 and 2099. A **Graphic Calendar** shows which days contain Names, and a "Key Word" Search is provided which can be output to the Screen or Printer.
Tape DATE-O-BASE CALENDAR (Each Tape File will hold up to 400 Names) \$16.95
Disk DATE-O-BASE CALENDAR (4,000 Names at 300/Month per Disk) \$19.95

Interested in **INTEREST** (the Money Kind)?
An **EXTENDED BASIC** Program that will help you deal with numerous problems requiring interest calculations. Present Value, Rate of Return, Current Bond Yield and Rate of Return to Maturity, Loan Repayment Amortization Schedules, etc.
Tape \$29.95

Data Base Management System
DISK DATA MANAGER 68K - **EXTENDED BASIC** w/ Mach. Lang. Routines. Allows a max of 246 Fields, and 14 Fields per Record, and another Record can be linked to the first; 8 Char. Field Names, up to 99 Char. per Field. Powerful On-Screen editor for input and update, flexible Output capabilities including output to Disk Files for use by other Programs. Change File Definition without re-entering the Data, Split Files, etc. Allows Multiple Field Sorts, Select on any combination of Fields, etc. An extremely **POWERFUL TOOL**. Instructions provide examples of Mailing Lists and a Financial Stock Profit and Loss Tracking System.
Disk \$54.95

ACCOUNTING
DISK DOUBLE ENTRY - **DISK EXTENDED BASIC** w/ Mach. Lang. Routines. A "Traditional" Accounting Package for Small Business, Clubs, Churches, Personal Use, etc. Up to four levels of subtotals with Trial Balance, Income Statement, and Balance Sheet Reports. **SEE** allows up to 300 accounts and a Trial Balance of \$9,999,999.99. Transactions may be up to 14 lines long, and comments and explanations may be freely used. Accounts are traceable to the journal transaction, which may include comments. Screen reports allow review of past transactions and current balances.
Disk \$44.95

STYLOGRAPH 3.0 - A full screen oriented, **WORD PROCESSOR**.
Now runs on the Data-Camp and FLE Color FLEX Systems using the 51 x 24 Display Screens. Full screen display and editing (i.e., what you see is what you get) supports the Delay Wheel proportional printers.
SPECIAL Color FLEX STYLO \$195.00; FLEX and OS-9 STYLO \$295.00; UNIFLEX STYLO \$395.00

Fast SPELLING CHECKER - allows directly changing the Text File, adding words to the dictionary, etc. 75,000 words in less than 400 seconds.
FLEX Color FLEX OS/9 \$125.00 UNIFLEX \$175.00

MAIL MINDER - greatly extends the power and flexibility of STYLOGRAPH. Allows Multiple Text files to be printed out as one large document. Provides for merging information into the Text file during printing (such as different names and addresses), etc.
FLEX Color FLEX OS-9 \$145.00 UNIFLEX \$195.00

IMPROM Data Base Management System - An **XBASIC**-based, Menu Driven, **DBMS** with "Built-In" Audit Tracking, Extremely Powerful Report & Format Capabilities, etc. This **Word Process DBMS** will become the "Work Horse" of your Software Studio.
FLEX and Color FLEX \$295.00 UNIFLEX \$395.00

ACCTS INCL. ACCTS Payable & Gen Ledger - A **FULL ACCOUNTING** Package that can be used together, or as separate packages; provides the IRS required Audit Tracking. (**XBASIC**, based on the "Osborne Business Programs.")
FLEX and Color FLEX \$295.00/PROG UNIFLEX \$395.00/PROG

AN Electronic Speed Sheet
SYNCHRON - THE Electronic Speed Sheet for 6809 Computer Systems. An extremely **POWERFUL** Business Tool, this Program will find an unlimited number of "non-business" applications. Also (for example, I have just finished setting up a Full Junior College Electronics Curriculum using **SYNCHRON**). Advanced features like "Mobile Lookup" make Source Text work easy. Color or RGB Sorting for numerous applications etc. Completely "Memory Resident" Machine Language; this Program is **FAST**. Provides STANDARD FLEX Text File output for use with BASIC, word processors, email, etc.
FLEX and SPECIAL Color FLEX (with FLE and Data-Camp) \$200.00 UNIFLEX \$395.00

Machine Language DATA BASE MANAGEMENT System
Westchester Applied Business Systems **XING** Data Management Systems. Possibly one of the most powerful DB's available, this machine language program is small enough to operate on a single sided 5 1/4 disk, yet provides the speed of M.L. and power limited only by the user's imagination. Supports Sequential, Hierarchical, and Random Access File Structures, and has Virtual Memory capabilities for those Giant Data Bases. Easy-to-use English Language Command Structure.
XING - FLEX and Color FLEX \$179.95 XING+ - FLEX and Color FLEX \$250.00

UNIVERSAL DATA RESEARCH INC. - Note: ALL Accounting and DBM Progs. Require FLEX and **XBASIC**. These are Time Tested programs from an old, established, software house for **Color FLEX** Systems.
Data Base Manager Part 1 - \$40.95; Data Base Manager Part 2 - \$49.95
Church Contributions - \$49.95 Single Entry Gen Ledger - \$49.95 Balanced Billing System - \$49.95

Integrated Software for Color FLEX
A/C \$99.95 A/P \$99.95 Gen Ledger \$109.00 Inventory 2 \$69.00 Payroll \$99.95

FLEX and UNIFLEX - Note: Requires **XBASIC** (FLEX) or **basic** (UNIFLEX)
A/C - FLEX \$295 UNIFLEX \$395 A/P - FLEX \$295 UNIFLEX \$395
Gen Ledger - FLEX \$295 UNIFLEX \$395 Inventory 2 - FLEX \$295 UNIFLEX \$395
Payroll - FLEX \$295 UNIFLEX \$395 DBM - FLEX \$350 UNIFLEX \$450
Please specify 5 or 8 inch disk when ordering all software!

Computer Systems Consultants FLEX XBASIC Programs
FLEX and Color FLEX \$50.00 UNIFLEX \$75.00
FLEX and Color FLEX \$100.00 UNIFLEX \$150.00
FLEX and Color FLEX \$100.00 UNIFLEX \$150.00
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SPELLER "Computer Dictionary" - OVER 120,000 words.
No more "let your fingers do the walking through the dictionary" while you are inputting Text with your favorite Editor or Word Processor. **SPELLER** is more than "another Spelling Checker"; it allows you to look up a word from within your Editor or Word Processor so that you **KNOW** it is right WHEN YOU TYPE it IN with the **SPELLING** utility which operates in the FLEX Utility Space). Yes, it **ALSO** allows you to check and update the Text after you are finished; along with allowing you to add words to the Dictionary, "flag" questionable words in the Text for evaluation later, "view a word in context" before changing or ignoring, etc. **SPELLER** first checks a "Common Word Dictionary", then the normal Dictionary, then a "Personal Word List", and finally, any "Special Word List" you may have specified. **SPELLER** also allows the use of Small Disk Storage systems.
FLEX and Color FLEX \$19.95

JUST - A Text Formatter
JUST, a Text Formatter developed by Joe Anderson, provides numerous features which make it a valuable addition to any FLEX Users Software Library. **JUST** is designed for formatting Text Output for IBM Matrix Printers and provides many unique features:
-Output the "Formatted" Text to the Display for format analysis and change.
-Output the "Formatted" Text to a Text File for use with the **supplied PRINTOUT** for producing multiple copies of the Text on the Printer INCLUDING PREDEFINED PRINTER COMMANDS (this utility is very useful at other times also, and worth the price of the program by itself).
-User Configurable for adapting to other printers (comes set up for Epson 68-88 with DraftPrint) provides for up to ten (10) embedded "Printer Control Commands", such as Boldface on and off, boldface on and off, etc.
-Automatic compensation for a "Double Width" printed line.
-Includes the normal line width, margin, indent, paragraph, space, vertical skip lines, page length, page numbering, centering, fill, justification, etc.
-Use with ANY Editor.
-Supplied with "Structured Source" (Metaphor PL/9) easy to see the flow of the program.
FLEX and Color FLEX \$49.95

SPECIAL! SPECIAL! SPECIAL!
Star-site excellent **SPELLER** Word Lock Up Program is ONE PACKAGE!
FLEX and Color FLEX Systems - BOTH for ONLY \$150.00!
When these are gone, the price goes UP! MAY 1991 ORDER NOW!

Also, call for "More Info" on both the FLEX Based and Color Computer Based **STAR-SITE** Products including the **HS8000** Monitor, Check 'N Tax Program, **8840TSM** Color Computer External Terminal Program, etc.

PASCAL UTILITIES - Requires **LUCIFERA** Pascal ver 3.
SNIP - produce a Cross Reference Listing of any text oriented to Pascal Source.
INCLUDE - allows the inclusion of other Files in a Source Text; has unlimited nesting capabilities. Also allows Binary File inclusions.
PROFILER - produces an Indented, Numbered, "Structogram" of a Pascal Source Text File. Allows viewing the overall structure of large programs, and provides clues as to the integrity of the program. Supplied as Source Code; requires compilation.
FLEX and Color FLEX - Each program \$25.00

COPYCAT - (Pascal NOT required) Allows reading TSC Mini-FLEX, SRB 10600, and Digital Research CP/M disks while operating under FLEX 1.0, FLEX 2.0, or FLEX 3.0 with 6800 or 6809 Systems. **COPYCAT** will not perform Miracles, but, between the program and the manual, you stand a good chance of accomplishing a transfer. Includes Utilities to List Directories, Copy Files, and convert Text Files when required. Also includes a Utility for investigating Physical Compatibility problems. Programs supplied in Modular Source Code to make it easier to solve unusual problems.
FLEX and Color FLEX \$70.00 FLEX II \$65.00

O-F - OS/9 to FLEX - FLEX to OS/9 -
Finally the barrier has been removed between OS/9 and FLEX formatted disks. Now you can READ from, and WRITE to, a Single sided 5" or 8" FLEX diskette from OS/9 with O-F. O-F is a new and unique program, written in **MACROS** (with **SLUTTER**), that performs the following functions:
REFORMAT: A **REFORMAT** Program that reformats a chosen amount of an OS-9 disk to FLEX Format so it can be used normally by FLEX.
FLEX: A **REFORMAT** Program that does the actual read or write function to the special O-F Transfer disk; all selectable from a user-friendly menu. Functions provided include reading the FLEX Directory, Deleting FLEX Files, Copying both directories, etc. All selections are interactive and complete, including all necessary prompts to the operator.
FLEX users can read, write and use the special disk as any other FLEX disk, provided the FLEX directory is not allowed to continue beyond track zero (too many files).
FLEX and Color FLEX \$79.95

COPYFILE.CMD - Copy LARGE disks to several smaller disks -
The following FLEX utilities allow the backup of **ANY** disk to any **SMALLER** size diskette (Winchester to 8" or 5 1/4", 5 1/4" to 5", etc.). By simply inserting diskettes as requested by **COPYFILE**, a LARGE disk system may be downloaded to YOUR present floppy disk system, any size. No need to fiddle with directory deletions or any of the other tedious operations that must be done using the normal copy routines.
COPYFILE.CMD understands normal "copy" syntax and always keeps up with files already copied by maintaining directories for both host and receiving disk system, eliminating hours of tedious keyboard entries and other time consuming cleanup chores.
BACKUP.CMD is a special program that downloads "random" type files, any size.
RESTORE.CMD a special program to restructure copied "random" files for copying, or re-copying back to the host system.
FRAGCHK.CMD a "bonus" utility that "relinks" the free chain of floppy or hard disk thereby eliminating fragmentation.
Completely documented source files included. ALL 4 Programs \$99.50 (8" or 5")

CHESS 6809 - Requires FLEX and DISPLAYS on any Type Terminal
Features:
-Two display boards. -Change skill level. -Swap side. -Point scoring system. -Four levels of play. -Solve Checkmate problems in 1-2-3-4 moves. -Take move and swap sides. -Play white or black.
This is one of the strongest **CHES** programs running on any microcomputer, estimated **USCF** Rating 1600+ (better than most "club" players at higher levels).
FLEX and Color FLEX \$79.95

DIET-TRAC Forecaster is an **XBASIC** program that plans a diet in terms of calories and percentage of carbohydrates, proteins and fats (C P G) or grams of Carbohydrate. Protein and Fat food exchanges of each of the six basic food groups (vegetable, bread, meat, skin milk, fruit and fat) for a specific individual.
Sex, Age, Height, Present Weight, Frame Size, Activity Level and Basal Metabolic Rate for normal individual are taken into account. Ideal weight and sustaining calories for any weight of the above individual are calculated. When a weight goal is given (either gain or loss), and a calorie plan is agreed upon between the computer and the individual, the number of days to reach the weight goal is projected. The starting and ending rate of weight loss is calculated, and a daily calendar with each day's weight for a 30-day period is printed.
FLEX - \$59.95 UNIFLEX - \$89.95

UNIFLEX - A **COMMUNICATION** Package for the **UNIFLEX** operating System -
Allows **UNIFLEX** Based Systems to Transmit and Receive files to and from other Computer Systems via Modem. Use with CP/M, Main Frames, other **UNIFLEX** Systems, etc.
- Verifies Transmission Integrity using checksum or CRC
- Automatically Re-Transmits bad blocks
- Transmits data in 128 byte blocks
UNIFLEX \$299.99

Super Sleuth - Powerful, **INTERACTIVE**, **Disassembler**, provides Hex/ASCII Screen Dump of Memory Blocks or Disk Files for easy Examine/Change, Area Definitions; X-REF Generator of Source Code; change Address labels to Names, etc. **Disassembles** 6800/1/2/3/8/9 and 6802 Code.
Color FLEX Obj. Only \$58.00, w/source \$99.00; FLEX \$99.00; UNIFLEX \$180.00; OS-9 \$180.00

UNIFLEX + - An "easy to use" 6809 disassembler for use w/ Disk Files. (Will also disassemble **GEN** Code). Develop a "Control File" of Area Definitions during successive disassemblies; X-Ref Source Files; replace Hex locations with Label Names; etc. Label Files provided for Mini-FLEX, FLECO, FLEGO, Color Computer FLEX.
FLEX and Color FLEX \$100.00 OS-9 \$150.00 UNIFLEX \$300.00

TSC Micro Assembler - the **FLEX OS/9** Assembler
TSC **Macro**, **Asm**, **Link**, **Load**. - Used for many of the C and Pascal Comp. FLEX & Color FLEX \$150.00

880AC - Relocating, Recursive-Macro Assembler and Linking Loader for the 6809. Use either standard Motorola Format or Special Ed Smith Format. Supports Recursive Macros, Conditional Assembly, etc. Opt. X-Ref Listing; Includes a Small (line-oriented) Editor as part of the Assembler. Greatly improved operating manual. FLEX and Color FLEX **8809 880AC** w/Link and Editor \$150.00 w/source, add \$58.00

OmegoSoft Relocatable Assembler and Linking Loader - 2-pass Pascal. Ready 2-pass Link. Load. Supports 8 Char. Labels, System Calls (SWI's) PC A's, Expressions with Arith., Logic, and Shifts, etc.
\$144.00 FLEX and Color FLEX \$125.00 (one year Maint. \$50.00)

MACT - (by Graham Trotter) from **WESTCHESTER MICRO SYSTEMS**. A combined Editor/Assembler designed to allow the Programmer to Enter, Edit, and Assemble Programs with a minimum of effort, w/o leaving the Program. **MACT** is a Cross Assembler for the MC6800/1/3 and Hitachi HD6301 (CMOS 6801) with the same functions and features as **MACT**.
FLEX and Color FLEX - \$95.00

UNIFLEX "basic" Os-Compiler
This is a **Basic** & Source Listing from **UNIFLEX** Compiled BASIC Programs. Easy to Use; works w/ ALL Versions of **UNIFLEX**. Ready Output to Disk or Term. Time Tested and **PROVEN** SOLID. UNIFLEX \$219.95

PL/9 - (by Graham Trotter) from **WESTCHESTER MICRO SYSTEMS**. A "structured" Assembly Language Editor/Compiler/Debugger, all in ONE PACKAGE; provides a totally **INTERACTIVE** Program Development Cycle. The Compiler supports large Symbol Tables, Variable Types, Pointers, Control Structures, Stack, A-, B-, and D-register manipulation, etc. The Source oriented Trace/Debugger provides Single Stepping, Breakpointing, etc. An excellent Software Development Tool for utilizing the power of the 6809. FLEX and Color FLEX - \$190.00

C - (By James McLoach) from **WESTCHESTER MICRO SYSTEMS**. **SUPER C** Compiler for the FLEX Operating System. Needs the TSC Relocating Assembler/Linking Loader for those "full blown" System Packages. FLEX and Color FLEX - \$295.00

Intel 6809 "C" Compiler, generates very efficient object code. Output "benchmarks" close to 100% MDCO in 8 bit Operations; 1.5 times faster than a 4 Mhz 286 when using a 200x 6809 System (Re. p 43, '88' Micro Journal, May '83).
FLEX, Color FLEX, OS/9 \$275.00 UNIFLEX \$425.00

TSC PASCAL - Native Code Compiler (OS/9 Oriented). FLEX and Color FLEX \$200.00

Lucidata PASCAL - P-Code Compiler (TSC Standard). Designed especially for Microcomputer Systems; Run-Time System checks available resources for each task, allowing operation on even minimal computer systems. Allows Linkage to Assembler Code for maximum flexibility.
FLEX and Color FLEX \$7 \$190.00 FLEX II \$205.00

OmegoSoft PASCAL - For the **PROFESSIONAL**; 120 Based, Native Code Compiler. For Real-Time and Process Control applications. Use custom I/O devices in place of the Pascal INPUT and OUTPUT long int. (32 bit); dynamic length strings; Interrupt processing, ROM-able, P2C, Re-entrant Code, etc. **PORTABLE**. Includes Source for the Symbolic Debugger, Runtime, and several Utilities. Requires a "Motorola Compatible" Relocating Assembler and Linking Loader.
\$202.00 FLEX and Color FLEX \$425.00 (one year Maint. \$100)

DYNASOURCE - Multi-User, Multi-Tracking with FLEX
Southwest Media is now shipping **DYNASOURCE FROM SOURCE** - the multi-user, multi-tracking capability of **DYNASOURCE** allows users the advantages of more sophisticated and time saving computer usage without having to buy or learn a new language or operating system. **DYNASOURCE**, as its name implies, allows true "time-sharing" operation under the popular FLEX operating system, and also allows each user to run two simultaneous jobs (multi-tasking) even on single-user systems. For example, while in **EDIT**, you can list another file or examine a directory. Or, you might look up an item in a Data Base while a sort is in progress. **DYNASOURCE** also provides some fringe benefits that will be greatly appreciated by FLEX users, including type-ahead, command line editing, and instant response to "escape".
DYNASOURCE is the painless method to use your existing files computer by simply adding 64K of RAM for each user. First is, you still use FLEX just like you always have. **DYNASOURCE** is not intended as competition to **UNIFLEX**. It does not improve the speed of FLEX, and does not offer password protection or other niceties of a full-blown multi-user system. What **DYNASOURCE** does do is give FLEX users a low-cost way to use existing software in a multi-user, multi-tasking environment, so your existing FLEX versions of BASIC, **XBASIC**, editors, assemblers, disassemblers, sort/merge packages, word processors, compilers, **TRACCAT** spread-sheet package, and so on are still good.
NOTE - The initial release of **DYNASOURCE** is for **OS/9** 8/09 Computers, but versions will also be available for other popular attached-memory (up to 1024K) systems, such as **RELIX** and **OS/2**. A minimum of 128K of RAM will be required with ALL versions. **DYNASOURCE** requires 64K of RAM for each active task; thus a 256K system could allow foreground-background operation on two terminals, or foreground-only operation on four terminals. **AVAILABLE NOW** from **SOUTHWEST MEDIA** - \$200.00

ALPHABET - MICROPROCESSOR - QUALITY SOFTWARE SERIES
FLEX - UNIFLEX - OS/9 - Color Computer

For the past several months, we at the Southwest Media Division of Computer Publishing, Inc. (CPI), the parent company of "68" MICRO JOURNAL and COLOR MICRO JOURNAL, have debated expanding our software distribution business. Many other magazines have been doing so for years (in fact, MOST were in the software distribution business BEFORE they began to publish a Magazine). Presently there are many fine examples of software that has been developed by VCL, our readers, that will never see the "light of day" due to the cost of advertising and TIME and cost involved in the production, distribution, and Customer SUPPORT of that software unless **EXPENSE**, with enough exposure and the willingness to continually advertise, runs with the ball.

Software is the "backbone" for the total utilization of any Computer System, and ours are no exception! This has been no simple decision. While we realize that there could be some conflict with some of our advertisers, we ALSO hear a LOUD and continuous cry for **HELP** from our Readers. From day one, the foremost concern of "68" MICRO JOURNAL has been it's **READERS**. Therefore, our Southwest Media Division will accept, for appraisal, for possible distribution, 6809 software; Games, Utilities, Software Development, Business Application Programs, etc.

In the past there has been too much software offered that was not quite ready. We will strive to eliminate that element. But, right up front, we tell you only that we will do our very best nothing more. Also, we will strive to keep cost to a bare minimum, while securing for the author a fair return in royalty payments, promptly paid, and in customer support for his product.

Of course, we will expect, no -- **EXPECT**, that the author keep the product free of errors (bugs), and maintain it in a prompt and business like manner. Also we shall require that authors be willing to furnish "source" for these programs that justify, by price and utility, inclusion of same. The lack of source code, properly commented, is a criminal complaint we hear. Not all programs will be sold with source, but where necessary we will insist that it be included.

In some instances the program may be small and short and not justify itself as a "single" sale product. In this event it will be combined with other like programs, and offered as a package. In that event, the royalties will be split between the various authors.

If you have software that you feel will qualify under this program, please contact one of the people below. Remember, if your software has any problems or "bugs" -- **GET IT STRAIGHT BEFORE YOU CONTACT US!** Also get your source code in proper shape and well commented; there is too much 99% code already drifting around.

If your software is **READY** contact: Rob May, Don Williams, or Tom Williams
Southwest Media is a division of Computer Publishing, Inc. (CPI), a family of 100% user support facilities.

Depend On South East Media Make Your 'BACK-UP' On South East Media FREE DISKETTE With Each \$50 Purchase
SOUTH EAST MEDIA
"FLEX is a trademark of Technical Systems Consultants For Ordering Call TOLL FREE 1-800-338-6800 5900 Cassandra Smith Rd., Hixson, TN 37343
"OS9 is a trademark of Microware (615) 842-4601

contents, provides listing controls such as a pause when the Screen is full, etc. It also provides much more flexible Commands; for example, if you enter **CAT .TXT** it will display a Disk Catalog of the Files with a ".TXT" Extension ONLY, or if you enter **COPY 0 1 .TXT** it will copy ALL of the Files from the Disk in Drive 0 to Drive 1 that have a ".TXT" Extension, etc. Like the Radio Shack Operating System, FLEX is strictly a Single User Operating System.

The OS-9 Operating System, on the other hand, has Multi-User (several Users can use the same Computer at the same time) and Multi-Tasking (more than one Program can be run at the same time) capabilities. OS-9 and the 6809 Computer Chip provide the most powerful 8-bit Computer Operating System available **anywhere**. We noted that the Radio Shack Operating System was ROM Based, and that FLEX was Disk Based; the OS-9 Operating System, in general, can be EITHER (or even Tape Based, for that matter, but the use of the Microcomputer Tape Systems would severely restrict its capabilities). Where the RS and FLEX Operating Systems are fixed in memory, OS-9 can live ANYWHERE. Where the RS and FLEX Operating Systems are effectively each a single program, OS-9 is made up of several **MODULES**; portions of programs that are linked together. It can be used with a few modules (for example, in a Traffic Light Controller), or with numerous modules (for example, as is used in the GIMIX III Computer System with "smart" I/O Ports, Dynamic Address Translation for use with up to a Meg of Memory, 5", 8", and Hard Disks, Serial and Parallel Printers, numerous Terminals, etc., all in the same System). But, with this Power and

Flexibility, it is actually an EASY Operating System to learn and use.

The OS-9 System that is available from Radio Shack for the Color Computer is the **OS-9 Level I Disk Operating System**. While Level I OS-9 will support Multi-User operation, it is somewhat restricted due to lack of Memory (it can only use 64K); and the limitations of the Color Computer (after all, you do not have a \$5,000 Computer System) make the Multi-User capability even more restrictive. There are actually two limitations in the Color Computer; the use of PIA's and Software to obtain Serial Data Transfer, and the requirement that the Interrupts must be disabled during Disk Operations. The Software driven Serial port will make it very difficult to allow a Terminal, for use by a second User, to talk back and forth with OS-9 when connected to the Serial port of the Color Computer (but a Printer works FINE); the only problems that shutting off the Interrupts during Disk accesses cause is that the "Clock" is shut off during that time, so will run a little slow, and you lose the Keyboard when a Disk is being accessed (which makes it a little hard to run a Printer Listing of a Disk File as a "background task" while you are using an Editor or Word Processor). Other than these two minor problems, I can see very little difference between the operation of OS-9 on the Color Computer or on the larger SS-50 Bus Systems. The more you use OS-9, the more you will grow to love it.

Continued next Month

pattern indicated a problem detected by the test program. This technique may be used with the older COCO's, but the newer ones have significantly less RFI, and is not as effective.

Soon afterward, an article appeared in BYTE Magazine describing a simple circuit which allowed an oscilloscope to be used to monitor address bus activity. The high-order eight bits of the address bus are connected to a digital to analog converter, and the low-order eight bits are connected to another digital to analog converter. One converter is connected to the horizontal input of the oscilloscope, and the other is connected to the vertical input, providing an X-Y display of the activity. The display shows address bus activity (or lack thereof) dramatically. Unfortunately, the display changes so rapidly that it is very difficult to see patterns in the addresses. It is also not possible to relate the display directly to addresses. Also, this method requires the use of an oscilloscope, which is more costly and usually more bulky than the COCO itself.

Another approach often used on older computers of all sizes is to simply provide a LED display for all address lines and/or data lines on the bus. This method also shows bus activity, and has the additional advantages of being cheaper and more portable than the oscilloscope method. It has the disadvantage of providing a display which is often changing so fast that it is not possible to see patterns in it.

To provide a display better suited to pattern recognition, I built the circuit below, which uses a TTL chip (74LS154) providing a one of sixteen output for any combination of four inputs. The four input lines are attached to the four high-order address lines. After this display is attached to the computer, the user will quickly begin to recognize normal and abnormal patterns. Since the sixteen LED's display the leading hex digit on the address lines, the changes among the lights will be vastly slower than in the one-to-one case. A seven-segment hex display would not work, since it will usually read '8', because the addresses normally change too fast to detect with the eye.

Actually installing this circuit into a COCO is reasonably simple. Individual LED's are usable, as are bar-graph LED's (available at Radio Shack), as long as they are of the separate anode and cathode or the common anode varieties. Because the loading factors are small, the circuit could be wire-wrapped on a small section of perf-board and point-to-point wired for power, ground, and address lines. The power, ground, and address lines could be picked up by tacking SHORT wire-wrap lines directly to the appropriate pins on the 6884 or on the 6809.

The LED's or bar-graph units may be readily mounted on the cover just above the keyboard by boring holes in the plastic, and then filing away the plastic, as necessary for the bar-graphs. The LED's should be labelled 0-9 and A-F in sequence from left to right. Press-on letters are available from many bookstores for a professional look. Since the bar-graphs come with ten LED's each, the extra four lines could be used as power indicators or could be buffered and used to indicate

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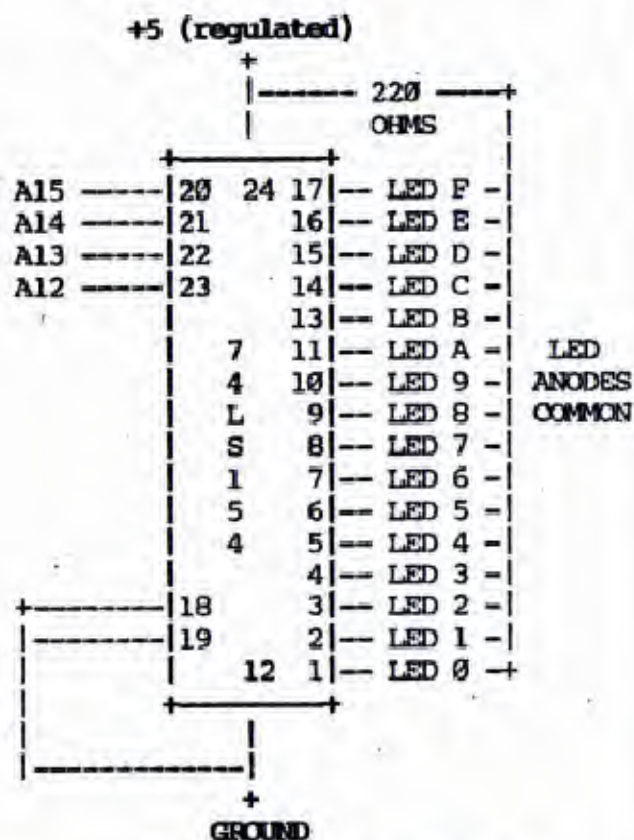
Where, Oh Where, Has My COCO Gone?
or
Somewhere Over The Rainbow
or
Lost In Space
or
The Black Hole

When working with computers, such as the TRS-80 Color Computer, without front-panel displays, it is often very difficult to know what the computer is doing. There are no blinking lights to indicate activity on the address and data busses. Without some assistance, it is often impossible to determine whether the COCO is not operational or is simply in some long internal computational or table-searching sequence.

My first encounter with the problem occurred several years ago while running extensive memory tests on a computer with elusive problems. I did not want to sit at the terminal staring at the screen for hours waiting for the memory test to output diagnostic messages. I placed an AM radio tuned to one of the RFI emission bands on the top of the computer while it was being tested. Since the memory test was so repetitive, it sounded like a metronome. Any break in the audible

other bus line logic levels.

A useful additional application of the display is as a debugging tool. Temporarily attaching a diode from one of the output pins on the 74LS154 to the NMI pin on the 6809 will generate an interrupt whenever any address in that range is generated. Of course, the user must provide an interrupt-handling routine and place its address into the SAM NMI vector register for this technique to work.



by E. M. (Bud) Pass, Ph.D.
Computer Systems Consultants, Inc.
1454 Latta Lane, Conyers GA 30207
Telephone Number 404-483-1717/4570

```

100 POKE 149,0:POKE 150,41:REM .. SETS 1200 BAUD
110 REM .. THIS PROGRAM CALLED 'BASLIST' AND LISTS A BASIC
    PROGRAM SAVED IN ASCII CODE. IT WILL ALLOW SETTING A LEFT MARGIN, AND
    WILL INDENT THE WRAP AROUND PORTION OF A LINE 1 SPACE PLUS THE NUMBER OF
    DIGITS IN THE LINE NUMBER.
120 REM *****
130 REM .. THE PROGRAM TO BE LISTED MUST HAVE BEEN SAVED USING THE 'A'
    FORMAT.
140 CLEAR 1000:CLS
150 INPUT"WHAT IS THE NAME OF THE BASIC PROGRAM. AS (BASLIST)";N$:PRINT
160 INPUT"ENTER TODAY'S DATE. AS (SEPTEMBER 18 1983)";D$:PRINT
170 INPUT"WHAT IS THE DISK NUMBER. AS (1000)";D:PRINT
180 INPUT"WHAT LEFT MARGIN. AS (4)";X
190 K=N$:N$=N$+"BAS":PRINT
200 C=0:P=1:GOSUB 320:PRINT
210 OPEN "!",#1,N$
220 IF EOF(1)=-1 THEN 300
230 LINE INPUT #1,L$
240 FOR N=2 TO 6:IF MID$(L$,N,1)="" THEN NEXT N
250 L1=N
260 IF LEN(L$)>(80-X) THEN GOSUB 400:GOTO 280
270 PRINT #2,TAB(X);L$:
280 C=C+1:IF C=58 THEN PRINT #2,CHR$(12);P=P+1:C=0:IF EOF(1)=-1 THEN
    GOSUB 320 ELSE 300
290 GOTO 220
300 CLOSE #1:END
310 REM *****
320 REM .. SUBROUTINE TO PRINT HEADING AND SET BOLD PRINT.
330 CLS
340 PRINT #2,TAB(X);D$:TAB(32-X);"TRS-80 COLOR COMPUTER";CHR$(29);
    CHR$(31);
350 PRINT #2,TAB(60-X);K$:CHR$(30);"/BAS"
360 PRINT #2,TAB(X);"JOHN H. DEAL";TAB(36-X);"DISK NO.
    ";D:TAB(63-X);"PAGE NO. ";P
370 PRINT #2:PRINT #2:IF P>1 THEN PRINT #2
380 C=0:RETURN
390 REM *****
400 REM .. SUBROUTINE TO INDENT A WRAP AROUND LINE.
410 GOSUB 490
420 PRINT #2,TAB(X);L1:C=C+1
430 L2=RIGHT$(L$, (LEN(L$)-LEN(L1)))
440 IF LEN(L2)>(80-X) THEN L$=L2:GOSUB 490:GOTO 460
450 IF LEN(L2)>=(80-X) THEN 470
460 PRINT #2,TAB(L1+X);L1:C=C+1:GOTO 430
470 PRINT #2,TAB(L1+X);L2:C=C+1
480 RETURN
490 FOR J=1 TO 20
500 L1=LEFT$(L$, ((80-X)-J))
510 IF RIGHT$(L1,1)="" THEN 520 ELSE 530
520 NEXT J
530 RETURN

```

by
John H. Deal

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BASLIST/BAS

As now written, this program allows user selection of the LEFT MARGIN, and will automatically indent the wrap around portion of a line properly, for line numbers of up to 5 digits. Also the number of wrap around lines is unlimited, depending only on the length of a line permitted by BASIC. It does come into play, however, for large left margins. The Margin may be changed to suit by altering 'X' in line 560.

I am using an OKIDATA 83A printer. CHR\$(30) prints the normal 10 C.P.I. while CHR\$(29); CHR\$(31) prints Bold Type.

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XDMS System Documentation only (\$10. credit toward purchase). . . \$ 24.95

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All software is written in Macro/assembler and requires 6809 FLEX DOS. CoCo users will need F-MATE or FHL FLEX, 64K RAM and 1-2 disk drives. Terms: Check, Money Order, Mastercharge or Visa. Shipment First Class. Add P&H \$2.50 (\$7.50 Foreign). State Res add sales tax. Specify 5 or 8". Sales: South East Media 1-800-338-6800 Consultation: 914-941-3552 eves. FLEX is a trademark of Technical Systems Consultants, Inc.

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Many have purchased compilers and then discovered that the particular compiler purchased either is not the most efficient for their purposes or does not contain features necessary for their application. Thus the added expense of purchasing additional compiler(s) or not being able to fully utilize the advantages of high level language compilers becomes too expensive.

The following COMPILERS are reviewed initially, more will be reviewed, compared and benchmarked as they become available to the author:

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REVIEW

RDC-1 DISK CONTROLLER

F & D Associates RDC-1
1210 Todd Road
New Plymouth, OH 45654
(614) 592-5721

The F&D RDC-1 Disk Controller Board for the Color Computer is an EXCELLENT example of "later technology" over the Radio Shack Disk Controller. One of the weak points in the RS Disk Controller is the omission of a precision Data Separator (evidently to hold the price down); see "Why CoCo can't Read", CMJ, Sept. '83. The other problem that has been persistent with the RS Disk Controller is the intermittent operation after the Controller has been in use a while, which is caused by corrosion due to the dissimilar metals in the ROM Slot Connector and the PC Board Edge Connector. The RDC-1G eliminates BOTH of the problems, and with a much LOWER parts count. It also provides flexibility in providing jumpers for the use of other Controller Chips, such as the 1797, and/or ROMs, such as the F & D FADBUG-C.

The RDC-1 is NOT available from F & D as a complete unit, or even as a complete PARTS KIT. The RDC-1 includes the bare PC Board, documentation, and a 9216B Data Separator Chip for \$49.95; while the RDC-1G is the same thing with Gold Plating on the PC Board Edge Connector for \$54.50. They also have available the Radio Shack Disk Basic ROM for \$35.00, a case for the Controller for \$7.50, the FADBUG-C Monitor for this Controller for \$25.00, and a 1793 Disk Controller Chip for \$32.00.

The packages and documentation are oriented towards the advanced hobbyist or industrial user who would normally have a lot of the required parts laying around, and would have no problem with the Documentation (which is oriented towards those with electronics experience). You should end up with LESS than \$150 in the whole Controller, even if you purchase everything including Sockets.

Once the parts are rounded up, it will take less than a couple of hours to assemble the Controller, and since there are no adjustments, it SHOULD work the first try (ours did). While there is plenty of room on the Board so that the work is not at all tedious, this DOES assume some experience in Digital Electronics Assembly and Soldering Techniques.

Our RDC-1 worked with no problems until we tried formatting a disk under CoCo OS-9; it would write all of the Tracks, but the Drive would not return to Track 0 to Verify the Format. Investigation by F & D revealed that the the problem was in the standard WD1793 Controller Chip that we used; the SOLUTION was to use the Radio Shack version of the 1793, which is not made by Western Digital. (As a side comment, the only problem WE have had with the CoCo OS-9 has been in formatting a disk, and we have tried NUMEROUS Disks, Drives, and Controllers. It just acts like the

overall timing is cutting things TOO close. Once you get a disk formatted, everything works like a champ.)

The RDC-1 makes use of the new SMC9216B Data Separator Chip, which eliminates all adjustments and is less expensive than the popular chip sets normally used. The Board is the same size as the Radio Shack unit, and, with the Radio Shack Disk Basic ROM installed, is TOTALLY compatible with the normal Radio Shack Disk Systems. Installation of the FADBUG-C ROM will allow the FLEX Disk Operating System to be run WITHOUT RS Extended BASIC or Disk BASIC. Also, jumpers are provided for the installation of 28 pin EPROMs, allowing the use of 2716 through 27128 chips (2K thru 16K EPROMs). Jumpers are also provided for determining the Side Select connector pin number, the installation of a 1797 Chip, applying the Color Computer "CART" Line to pin 18 or 20 of the ROM, to connect the Cartridge Slot pins 7 and 8 together to enable the "automatic takeover" when a Cartridge is installed, etc.

The following parts list for the RDC-1 is provided so that you can begin rounding up the parts, estimating cost, etc.

INTEGRATED CIRCUITS

- 1 74LS163 Counter
- 1 74LS74 Dual-D Flipflop
- 1 74LS195 Counter
- 2 74LS06 Open Col. Drivers
- 1 74LS00 Quad NAND Gate
- 2 74LS04 Hex Inverters
- 1 74LS174 Hex D Latch
- 1 74LS02 Quad NOR Gate
- 1 74LS32 Quad OR Gate
- 1 SMC FDC9216B Data Separator
(Supplied w/ RDC-1)
- 1 1793 or 1797 FDC Chip
(1793 required for CoCo)
- 1 ROM or EPROM
(use RS Disk Basic for CoCo)

RESISTORS

- 4 150 ohm 1/4 watt 5%
- 2 1000 ohm 1/4 watt 5%
- 3 4700 ohm 1/4 watt 5%
- 3 10K ohm 1/4 watt 5%

CAPACITORS

- 1 4.7 mfd 15vdc Tantalum
- 7 .1 mfd 12v Disc
- 1 100 pf Disc

MISC. PARTS

- 1 PC Board
(Supplied w/ RDC-1)
- 1 8 Mhz Crystal
(optional items)
- 1 Dual Row Header for jumpers
- 2 "Mini Jump" programming plugs
(like those used in the CoCo)
- 1 plastic Controller Case
- 1 8 pin socket
- 8 14 pin sockets
- 3 16 pin sockets
- 1 24 or 28 pin socket (for ROM)
- 1 40 pin socket

The F & D Associates RDC-1 is an EXCELLENT Disk Controller option for the Radio Shack Color Computer, providing RELIABLE Operation with a low parts count and NO adjustments (which means that as long as the Crystal is in tolerance, it should work with no problem). While it DOES require a little Electronics experience to assemble, it is NOT out of reach of most "hardware hackers" (if you don't have the experience, you probably have

a friend that CAN assemble it); and the price is unbeatable!

PS

For those that are not regular '68' Micro Journal readers, F & D Associates has been producing Disk Controllers and Accessories for the SS-50 Bus Computer Systems for a few years, so are not "new to the business". They will be there if you have a problem.

OMJ Staff

OOPS!!

MICROBOOKS CLARIFICATION

In the discussion of the trial and error setting the of DIM and CLEAR Statements in the discussion of the MICROBOOKS Program in the Nov. '83 Issue of Color Micro Journal, I stated that I averaged about 20 Bytes per entry in my use of the Program, and that 25 Bytes would be a useable size to set in this method. Somehow, the word "useable" got PRINTED as "UNuseable". Obviously, there is a small difference in the two words.

No entry size is unuseable if you balance the DIM size to the CLEAR size. In rough figures, the DIM size times the expected entry size should equal the CLEAR size. If the number of Bytes per entry turns out to be greater, the DIM size will necessarily need to be smaller.

Continuing the discussion, the article suggests that after adjusting DIM and CLEAR sizes, if you do not get an "OM ERROR", you should use "PRINTMEM" to see if you still have enough memory left over to put to use (in the DIM and CLEAR Statements). This would be the case if the sizes were too SMALL. Somehow, it came out talking about putting the program to use, NOT the left over memory.

Jim LaLone

Thanks, Jim, for the clarification. In going over his ORIGINAL Manuscript, we note that the "un" was NOT in front of the "useable"; STUPID COMPUTER! In other words, WE blew it, not Jim. This is why we request, WHENEVER POSSIBLE, that the discussion supporting a Program be in SOME kind of an ASCII Format, such as Radio Shack /DAT File, FLEX .TXT File, or OS-9 Format. That way, we can transfer it DIRECTLY to the Word Processor, eliminating these kinds of problems. A BASIC Program is "no sweat", because we can save it in ASCII Format, ".A", and then transfer it directly, so any RS BASIC Programs are "pure", but the discussions with them give us some trouble. The "FINAL TEST" in the submission Format is "Can you read the Article with a "LINEINPUT A\$" Statement and Print it back out to the Screen or Printer with a "PRINT A\$" "; if so, we can handle it on this end.

Sorry for the slip-up.

RLN, Editor

X-Y PLOTS with the MX80 in Basic09

Are you a business analyst, engineer, scientist, or a student of statistics? If so, this Basic09 GRAF Procedure could just possibly save you a lot of work! In the past there has been many a time when I wished for an easier way to plot regression analysis equations. Prior to writing the GRAF procedure, the plotting of equations was a luxury that I often passed up due to the number of calculations required for a chart of respectable resolution. Now, I can generate a chart in less than two minutes. Take for example the chart in Example 1. This chart has as its X Axis numbers that represents my home gas bills, by month, over two years. With this chart I can visualize when and how much natural gas we use at my house.

The "GRAF Procedure" is written in the BASIC09 language from Microware. BASIC09 is a very powerful and relatively easy to use language which operates under the OS-9 Operating

System (also by Microware), which adds considerable power the language. However, with the right motivation and skill, one could convert this procedure to run under almost any BASIC or PASCAL language.

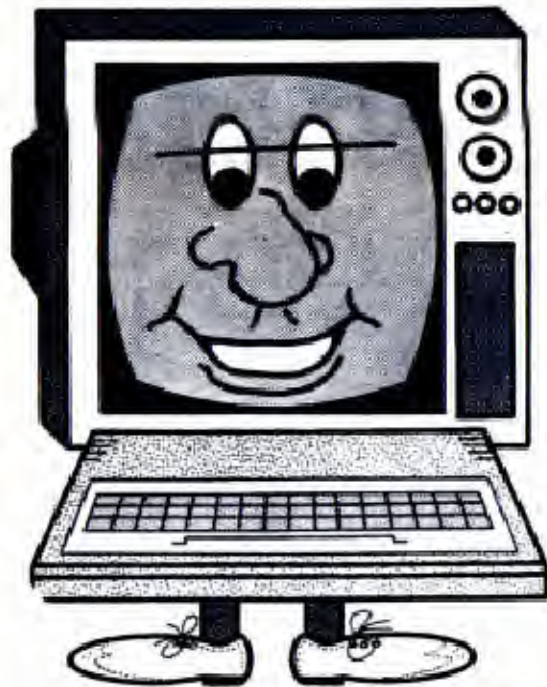
The graphic output is generated on a Epson MX80 Printer with the GRAFTRAX 80 ROMs installed. This printer, I also found, was easy to control.

The code, as presented here, operates as a subroutine. However, it could easily be modified to operate as a main procedure where the parameters are requested via the CRT.

The formulas that GRAF can plot are:

1. First degree linear equations of the form $Y = a + bX$
2. Second degree curvilinear equations of the form $Y = a + bX + cX^2$
3. Geometric equations of the form $Y = ab^{**}X$

In addition to plotting the line based upon the equation selected, this procedure will also plot up to 50 discrete points. This feature was added so that I could plot a selected regression formula along with the sample points that were used to



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WITH YOUR
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establish the formula. With this feature I could visualize the "goodness of fit" of the equation.

The range that the plot extends along both the X and Y axes is set via an input parameter. This scale parameter is used to establish the sizes of the X and Y axes scale divisions. There are always six X axis divisions and five Y axis divisions. The absolute size of these divisions does not change. It is only the scale represented by these divisions that is modified for each chart.

When constructing a chart by the manual method, you would normally draw the X and Y axes along with their respective scales. Then you would plot a number of points per the selected equation. Finally, you label the chart. This approach cannot be used with most microcomputers for two reasons. First, most printers cannot feed the paper in two directions. Thus, Multiple passes are impossible. Second, to generate the entire chart in RAM memory and then dump to the printer requires a minimum of 6K bytes just for the body of the chart. In addition, the code to access this 6K byte array would be fairly complex since it would need to address each bit individually.

The MX80 printer generates characters that use a nine by five dot matrix. The bottom row of dots is only used for descenders and block graphics. These characters are printed on lines with a vertical spacing of twelve dots. Thus,

there are three dots between each line of characters as a minimum. The MX80 BIT IMAGE GRAPHICS Modes can only address the top eight wires in its nine wire print head, limiting the number of rows that can be printed in one 'line' to eight. Strictly speaking, this is not a hardware limitation, but a limitation imposed by the size of a byte. The chart body generation can then only be accomplished eight rows at a time. As an alternative approach, you could have the body of the graph generated by using only one wire in the print head. By doing so you would then need to generate eight times as many 'lines'. Also, you would need to generate your own character set, since the MX80 could no longer print the Y axis scale. Since we want to print the Y axis scale as well as the body of the chart in one pass, we need to make the line spacing equal to eight dots plus limit the printing of characters for the Y axis to upper case only. This last limitation is really of no consequence since the data used in the Y axis scale is all numeric.

There are two basic BIT IMAGE GRAPHICS modes available in the MX80 with CRAFTTRAX-80. One of these modes provides 480 dots per line and the other provides 960 dots per line. The 480 dots per line mode is the one I have chosen since it provides more than enough resolution for generating charts. Also, this mode puts less of a burden on the communications port to the printer. When using the BIT IMAGE GRAPHICS modes the following table is used.

PRINT HEAD DOT PATTERN	VALUE	POWER OF 2
0 (TOP)	128	7
0	64	6
0	32	5
0	16	4
0	8	3
0	4	2
0	2	1
0	1	0
0 (BOTTOM)	N/A	N/A

For instance, the top dot is activated by sending the value of 128 to the printer, or the lowest addressable dot by sending a 1. These values can be summed. Thus, a value of 255 will activate all eight of the addressable dots in the print head. You will notice that the value associated with each addressable dot is a power of two.

The approach that I have found to work well considering printer capabilities, memory size, and program complexity was to generate the points for one line at a time. Each line actually consists of 1920 dots. These 1920 dots are made up of 8 rows of 240 columns each row.

After handling the normal house keeping chores of setting up the entry point, defining variables, and opening the printer path, the procedure begins by establishing the X and Y scale factors. Although setting the scale factors is easy, you must not ignore accuracy considerations. The physical chart is always 240 by 200 dots regardless of the scale. The trick in scaling is to modify the scaling factor such that the X scale is modulo 240 and the Y scale is modulo 200. I found it necessary to first fix the scale division size, and then the division size could be compensated for by the scale factor. By using this method, you often end up with either or both the X and Y axis lengths being smaller than requested. Increasing the requested X and Y axis sizes by 10% will usually give acceptable results.

The next significant step is to generate and print the chart body. There are several factors to consider here. First, the printer cannot feed paper backwards. Thus, you must print the entire chart in one pass from top to bottom. Second, the generation and printing must be accomplished eight rows at a time for each of the 240 columns in the body of the chart. This is required so that a Y scale can be printed using the MX80 upper case character set.

There is one additional characteristic of the GRAF Procedure that you must consider. After returning from the procedure, the Top-Of-Forms command will not generate the expected results. This is due to the use of a line height of eight dots instead of the standard 12 dots. The end result is that the MX80 line position is 112 vertical dots less than expected. This amounts to a little over nine lines that need to be compensated for by the calling routine.

I have included examples of FIRST DEGREE and EXPONENTIAL GRAF plots in Examples II and III respectively. The GAS CO. plot is an example of a second degree equation.

Color Micro Journal

Gold Plug 80

TRS-80+ MOD I, III, COCO, TI99/4a
TIMEX 1000, OSBORNE, others

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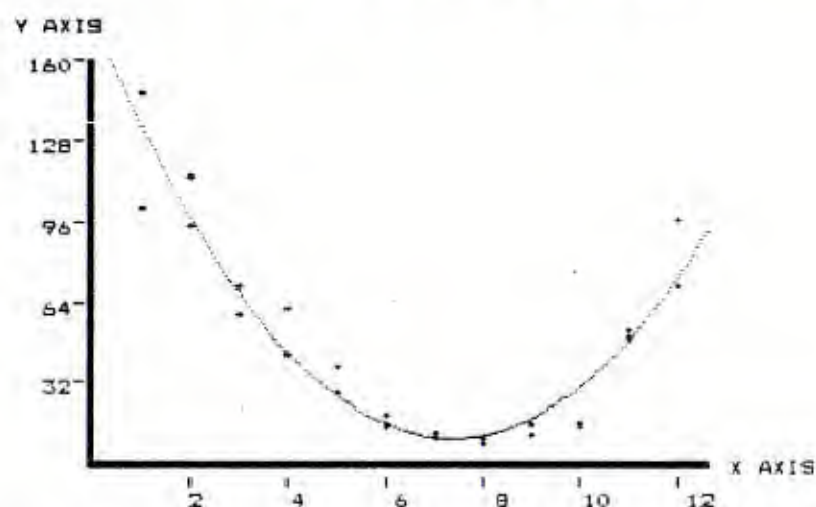
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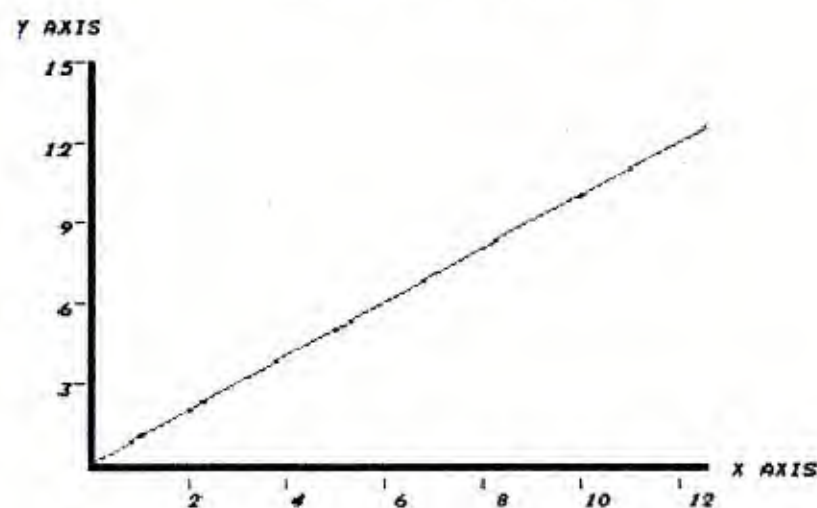
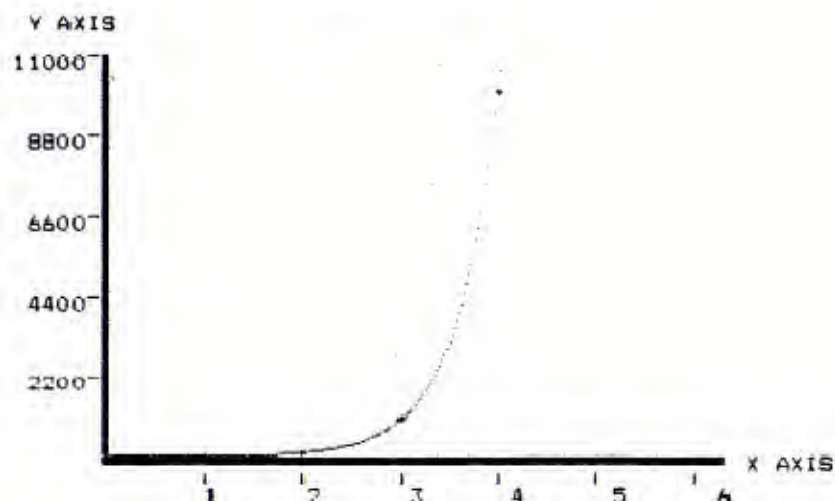
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EXAMPLE I - Y axis is in dollars and X axis is months

FIRST DEGREE

EXAMPLE II - Equation for line: $Y = 0.0 + 1.0 * X$ EXAMPLE III - Equation for line: $Y = 1.0 * 10.0 ** X$

PROCEDURE GRAF

```

0000  PARAM CHART_NAME:STRING(20); A_VALUE,B_VALUE,C_VALUE,X_MAX,
0040  Y_MAX:REAL; TYPE_GRAF,B:INTEGER; X2(50),Y2(50):REAL
0040  DIM PATH_NAME:STRING(24)
0057  DIM LOWER,UPPER:REAL
0057  DIM L,J,M,N,I:INTEGER
005E  DIM X_SCALE(5),Y_SCALE(5):INTEGER
0083  DIM X_DIV,Y_DIV:INTEGER
008E  DIM X_OFF,X_POS,X_VAL:INTEGER
009D  DIM POWER_TWOS:BYTE
00A4  DIM INC:INTEGER
00AB  DIM EIGHT_DOTS,X_DOTS,MAX_LINE,SCALE_TAB,TOP_DOT,PRINTER_PATH
00C6  :BYTE
00CD  DIM AXIS_DOTS:BYTE
00D4  AXIS_DOTS:=240
00D8  TOP_DOT:=128
00E2  SCALE_TAB:=243
00E9  EIGHT_DOTS:=255
00F0  MAX_LINE:=252
00F9  PATH_NAME:=""
0105  OPEN #PRINTER_PATH,PATH_NAME:WRITE

(* Set the X and Y scale values based upon the max values given *)
014A  X_DIV:=X_MAX/5
0157  X_FACTOR:=240/(5*FLOAT(X_DIV))
017E  FOR N:=1 TO 5
018E  X_SCALE(N):=X_DIV*N
0199  NEXT N
01A6  Y_DIV:=Y_MAX/5
01BA  Y_FACTOR:=200/(5*FLOAT(Y_DIV))
01CA  FOR N:=1 TO 5
01D0  Y_SCALE(5-N):=Y_DIV*N
01E8  NEXT N

(* SET UP AND PRINT CHART TITLE *)
022B  PRINT #PRINTER_PATH,CHR$(27);CHR$(83);TAB(17);CHART_NAME
0237  :CHR$(27);CHR$(84)
0238  PRINT #PRINTER_PATH \ PRINT #PRINTER_PATH

(* PRINT Y AXIS HEADER *)
0252  PRINT #PRINTER_PATH,TAB(15);"Y AXIS"
0253  PRINT #PRINTER_PATH,CHR$(27);"A";CHR$(8)
0266  INC:=0
0278  INC:=0

(* PRINT Y AXIS AND PLOT POINTS *)
0281  FOR N:=1 TO 5
02A3  PRINT #PRINTER_PATH USING "X12,I6",Y_SCALE(N);
02B4  'GOSUB 100
02C6  FOR I:=1 TO 4
02D0  GOSUB 200
02E0  NEXT I
02E4  NEXT N

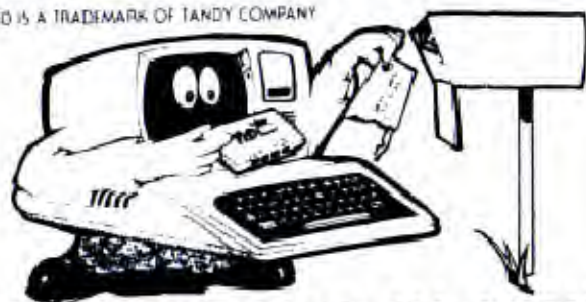
(* GENERATE X AXIS *)
0318  PRINT #PRINTER_PATH,TAB(20);CHR$(27);"K";
0319  PUT #PRINTER_PATH,EIGHT_DOTS
0320  PRINT #PRINTER_PATH,CHR$(0);
0336  FOR N:=1 TO 255
0341  PUT #PRINTER_PATH,AXIS_DOTS
0351  NEXT N
0358  PRINT #PRINTER_PATH," X AXIS"
0376
0377
0378

```

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```

0379 (* GENERATE X AXIS TAB POINTS *)
0399
039A PRINT #PRINTER_PATH,TAB(20); CHR$(27); "K";
039B PUT #PRINTER_PATH,SCALE_TAB
03AE PRINT #PRINTER_PATH,CHR$(0);
038B PRINT #PRINTER_PATH,CHR$(0); CHR$(0); CHR$(0);
03C3 FOR N:=1 TO 5
03D5   FOR I:=1 TO 39
03E6     PRINT #PRINTER_PATH,CHR$(0);
03F5   NEXT I
0401   PUT #PRINTER_PATH,MAX_LINE
0416 NEXT N
0421 PRINT #PRINTER_PATH
0427 PRINT #PRINTER_PATH,TAB(21);
0432 FOR N:=1 TO 5
0442   PRINT #PRINTER_PATH USING "X1,15",X_SCALE(N);
0459 NEXT N
0464 PRINT #PRINTER_PATH,CHR$(27); "2"
0472 PRINT #PRINTER_PATH \ PRINT #PRINTER_PATH
047F CLOSE #PRINTER_PATH
048D END
048E
048F
04AF (* GENERATE Y AXIS TAB POINTS *)
04B0 100 PRINT #PRINTER_PATH,TAB(19); CHR$(27); "K"; CHR$(6); CHR$(0)
04CE   ;
04E0   FOR K:=1 TO 5
04EA     PUT #PRINTER_PATH,TOP_DOT
04E5   NEXT K
04F5   PRINT #PRINTER_PATH,CHR$(0);
0500
0502 (* GENERATE Y AXIS *)
0517 200 PRINT #PRINTER_PATH,TAB(20);
0526 PRINT #PRINTER_PATH,CHR$(27); "K";
0535 PUT #PRINTER_PATH,EIGHT_DOTS
053F PRINT #PRINTER_PATH,CHR$(0);
054A   FOR I:=1 TO 3
0550     PUT #PRINTER_PATH,EIGHT_DOTS
0565   NEXT I
0571
0572
0573 (* CALCULATE FORMULA PLOT POINTS *)
0596
0597 INC:=INC+1
05A2 UPPER:=200-(INC*B-B)
05B4 LOWER:=UPPER-B
05C0 FOR X_POS:=1 TO 252
05D0   X_DOTS:=0
05D7   X_VAL:=X_POS/X_FACTOR
05E4   IF TYPE GRAF=3 THEN
05F0     Y_POS:=A.VALUE+B.VALUE**X_VAL
0600   ELSE
0604     Y_POS:=A.VALUE+B.VALUE**X_VAL+C.VALUE**X_VAL**X_VAL
0620   ENDIF
0622 Y_POS:=Y_POS*X_FACTOR
062E IF Y_POS<LOWER THEN
063B   GOTO 700
063F ELSE
0643   IF Y_POS>UPPER THEN
0650     GOTO 100
0654   ENDIF
0656 ENDIF
065B POWER_TWOS:=INT(Y_POS-LOWER)
065E X_DOTS:=FLOOR(2**POWER_TWOS/X_DOTS)
067F
0680 (* CALCULATE SAMPLE POINTS *)
0690
069E 300 FOR L:=1 TO B
06B2   X_VAL:=(B2(L)**X_FACTOR
06C2   Y_POS:=YB2(L)**X_FACTOR
06D1   IF X_POS=X_VAL+1 THEN
06E1     IF Y_POS<LOWER THEN
06EE       GOTO 500
06F2     ELSE
06F6       IF Y_POS>UPPER THEN
0702         GOTO 500
0707       ENDIF
0709     ENDIF
070B POWER_TWOS:=INT(Y_POS-LOWER)
0719 X_DOTS:=FLOOR(2**POWER_TWOS/X_DOTS)
072B ELSE
072F   IF Y_POS=X_VAL+1 THEN
073F     IF Y_POS<LOWER THEN
074C       GOTO 500
0750     ELSE
0754       IF Y_POS>UPPER THEN
0761         GOTO 500
0765       ENDIF
0767     ENDIF
0769 POWER_TWOS:=INT(Y_POS-LOWER)
0777 X_DOTS:=FLOOR(2**POWER_TWOS/X_DOTS)
0789 ELSE
079D   IF X_POS=X_VAL THEN
079A     FOR J:=1 TO 3
07AA       M:=J-2
0795       IF Y_POS+M<LOWER THEN
07C7         GOTO 400
07CB       ELSE
07CF         IF Y_POS+M>UPPER THEN
07E1           GOTO 400
07E5         ENDIF
07E7       ENDIF
07E9 POWER_TWOS:=INT(Y_POS+M-LOWER)
07FC X_DOTS:=FLOOR(2**POWER_TWOS/X_DOTS)
080E 400   NEXT J
081C   ENDIF
081E ENDIF
0820 ENDIF
0822 500 NEXT L
0830 PUT #PRINTER_PATH,X_DOTS
083A NEXT X_POS
0845 PRINT #PRINTER_PATH
0848 RETURN

```

John J. Strunk



NEWS RELEASE

Mark Data Products has released a new order entry system for the Radio Shack Color Computer. This sales order processing system will give a fast, efficient means to enter orders, print shipping papers and invoices, prepare sales reports, and monitor receivables. An outstanding machine language program is included with the system to automatically enhance the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer, and one or more disc drives.

The MDP order entry system is a family of programs which operate interactively by means of a "menu" selection scheme. Up to 900 products may be defined and a single disc system can hold over 500 transactions. When the operator selects a task to be performed, the computer loads a program designed to handle that task from the system disc. This modular design concept reduces the amount of memory used and simplifies what would otherwise be a very complex, unmanageable program. The system disc contains all of the programs required to create, update, and maintain data files and prepare the necessary paperwork including shipping and invoice forms, daily sales reports, a monthly (or other period) sales report and a receivables report.

The primary objectives of this order entry system were:

- * It must be accurate, user friendly and simple to use.
- * It must be easy to customize for specific user requirements.
- * All transactions must produce a traceable invoice.
- * It must handle receivables as well as closed orders.
- * It must be capable of future expandability.

This order entry software equals or exceeds higher priced packages for other computers and is available on disc with a detailed operating manual for just \$99.95. Order from your favorite dealer or direct from Mark Data Products, 24001 Alicia Parkway, #207, Mission Viejo, CA, 92691. Phone: (714) 768-1551.

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LINKING LOADER

Part 2

Continued from Last Month

Using the
LINKING LOADER
with the
Radio Shack DOS

SETTING UP YOUR SYSTEM

The Loader Program must be copied to your program development diskettes, and the Linker Subroutine must be copied to your library diskettes. An undocumented feature of the Color Computer's DOS is the ability to copy from one diskette to another with only a Single Disk Drive. Type in the Copy command, but do not specify an output Filename; for example, **COPY "LOADER.BIN"**. After the DOS loads the file, it will display a message to install the Destination Diskette. The name of the Linker module is **LINKER.BIN**.

You may also "LOADM" and "SAVEM" the loader.

SAVEM "LOADER", &H0E00, &H12D7, &H0E00

The Loader is written in Position Independent Code and will execute from anywhere in RAM. The buffer size will automatically be adjusted to suit the Program.

OPERATION

Type **LOADM "LOADER"**, then **EXEC**, to load and execute the Loader.

INPUT AND OUTPUT FILES

The message "MAIN PROGRAM NAME, OUTPUT FILE NAME" will be displayed. Enter the name of the main module and the name of the output module, separated by a comma. If no output file is named, the output will be written back to the input file. The output module will contain the merged program ready to be loaded, linked, and executed. The default extension for all files is **BIN**.

DISPLAYING THE LOAD MAP

As the modules are loaded, a load map will be displayed. You may direct the map to the screen or the printer. The message "MAP TO SCREEN OR PRINTER(S/P)" will be displayed. Type **S** to display the map on the screen or **P** to print the map on the printer. The load map displays the load addresses of the modules, as well as the end address and transfer address of the program. The Loader automatically appends the Linker Module after loading the specified modules. The program's transfer address will be the linker's execution address, which will be included in the load map.

USING A LIBRARY DISKETTE

You may find it convenient to keep your subroutine library on its own diskette. If you have only one drive, you will have to swap diskettes after

the main module is loaded and before the output file is written. After the main module is loaded, the message "LOAD LIBRARY DISK AND HIT ENTER" will be displayed, and the Loader will pause and let you swap diskettes. After the last module is loaded, the message "LOAD OUTPUT DISK AND HIT ENTER" will be displayed, and once again the Loader will pause and let you swap diskettes.

BUFFER SIZE

On a 16K system, the buffer size is approximately 10,900 bytes. On a 32K system the buffer size is approximately 27,200 bytes. If you run out of buffer space, the message "OUT OF MEMORY" will be displayed, and the Loader will abort.

LINKING

Linking is the process of loading the execution addresses of the subroutines into a jump table so they can be located when the Program calls them.

The Linker module performs the linking in two passes. Pass 1 gets the entry point of each module and stores it in the jump table. The module's location on the jump table is at **2 * the Module Number**. If the jump table is at **\$0E00**, the entry point of module 3 will be at **\$0E06**. The Linker presented here loads the jump table at **\$0E00** under RS DOS, but you can change it to fit your requirements.

Pass 2 calls the initialization routines of each module. The address of the vector is passed to the module in the Y register, in case you want to code jump tables in the modules

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```
themselves. Typical code might be:
INIT LDX 4,Y ENTRY POINT FOR SUBROUTINE 2
STX SUB4,PCR
LDX 10,Y ENTRY POINT FOR SUBROUTINE 5
STX SUB10,PCR
RTS RETURN TO LINKER
```

To call the subroutine, use:

```
JSR [SUB4,PCR]
```

After linking, the Linker passes control to the Main Module's entry point (the entry location for the Program you are writing) as specified in the main module's preface.

The Source Code for the Loader and the Linker presented here was written for the TSC Macro Assembler which is supplied with some of the Color Computer FLEX Conversions, but should be compatible with most 6809 Assemblers which support Macros and Conditional Assembly.

The Loader calls ROM routines for File and Terminal I/O, so will probably only work with V1.1 BASIC, V1.0 Ex. BASIC, and V1.0 Disk BASIC ROM sets at this time. We would be interested in hearing from you if you change the calls over to the new ROMs.

ERROR MESSAGES

The loader displays two errors regarding memory overflow. Other messages are produced by BASIC.

OUT OF MEMORY

The buffer is full. Your program, plus the subroutines, are too big for the buffer.

NAME TABLE OVERFLOW

The subroutine name table has space for 30 entries. This message is displayed when the 31st is encountered. Don't forget that the Link Module will be added to your program.

The most common BASIC error message will probably be the "NE" error when you name a subroutine which is not stored on the disk. The last entry on the load map will be the erroneous name.

Using the
LINKING LOADER
with the
FLEX DOS

OPERATION

Type the entry
LOADER Input-File <Output-File>

INPUT AND OUTPUT FILES

If no output file is named, the output will be written to a file with the same name as the input file, with a CMD Extension. The output module will contain the merged program ready to be loaded, linked, and executed. The default extension for the input file is BIN. The default extension for the output file is CMD.

DISPLAYING THE LOAD MAP

As the modules are loaded, a load map will be displayed (which can easily be directed to a Printer or File under FLEX). The load map displays the load addresses of the modules, as well as the end address and transfer address

of the program. The Loader automatically appends the Linker Module after loading the specified modules. The program's transfer address will be the linker's execution address, which will be included in the load map.

BUFFER SIZE

On a 16K system, the buffer size is approximately 14,000 bytes, while on a 32K system the buffer size is approximately 30,000 bytes. On a 48K system the buffer size is approximately 46,000 bytes. If you run out of buffer space, the message "OUT OF MEMORY" will be displayed, and the Loader will abort.

LINKING

Linking is the process of loading the execution addresses of the subroutines into a jump table so they can be located when the Program calls them.

The linker module performs the linking in two passes. Pass 1 gets the entry point of each module and stores it in the jump table. The module's location in the jump table is at the Module Number * 2. If the jump table is at \$BF00, module #3's entry point will be loaded at \$BF06.

Pass 2 calls the initialization routines of each module. The address of the vector is passed to the module in the Y register, in case you want to code the jump table in the module itself. Typical code might be:

```
INIT LDX 4,Y ENTRY POINT FOR SUBROUTINE 2
STX SUB4,PCR
LDX 10,Y ENTRY POINT FOR SUBROUTINE 5
STX SUB10,PCR
RTS RETURN TO LINKER
```

To call the subroutine use:

```
JSR [SUB4,PCR]
```

After linking, the Linker passes control to the main module's entry point as specified in the main module's preface.

The source code for the Linker and the Loader is written for the TSC Macro Assembler. Programs to run under either FLEX or Radio Shack DOS can be generated. Make your selection with the command line parameter &A. Use 'F' to select FLEX, or use 'R' to select Radio Shack, as shown;

```
ASMB LOADER +F for FLEX
ASMB LOADER +R for Radio Shack
```

ERROR MESSAGES

The loader displays two error messages regarding memory overflow; other messages are produced by FLEX.

OUT OF MEMORY

The buffer is full. Your program plus the subroutines are too big for the buffer.

NAME TABLE OVERFLOW

The subroutine name table has space for 30 entries. This message is displayed when the 31st is encountered. Don't forget that the Link Module will be added to your program.

If you get a FILE NOT FOUND message from FLEX, the last entry on the load map will be the erroneous name.

Roland Waggoner

```
OPT PAG
NAM LOADER
IFC 'A','R'
STTL RS DOS VERSION 1.0
ELSE
STTL FLEX VERSION 1.0
ENDIF
PAG
```

```
*****
*
* LOADER PROGRAM FOR THE RADIO SHACK *
* COLOR COMPUTER, with or w/o FLEX *
*
* COPYRIGHT (C) 1983 ROLAND WAGGONER *
* and Computer Publishing Inc. *
*
*****
```

```
*
* USE THE COMMAND LINE PARAMETER &A TO INDICATE *
* A FLEX OR A RADIO SHACK BASIC ASSEMBLY. *
* USE F FOR FLEX. *
* USE R FOR RS BASIC. *
*
```

```
*****
*
* MACRO TO DEFINE OUTPUT STRING FOLLOWED BY *
* A TERMINATOR. THE TERMINATOR IS $00 FOR *
* RS DOS, OR $04 FOR FLEX *
*
```

```
PSRNG MACRO
IFC 'A','R'
FCC '&1','$00'
ELSE
FCC '&1','$04'
ENDIF
ENDM
```

```
*
* MACRO TO CALL GET CHARACTER FROM FILE *
* ROUTINE. IF ASSEMBLED FOR RS DOS THEN *
* JUST JSR GETCHR(?). IF ASSEMBLED FOR *
* FLEX THE LBSR RCHR WHICH CALLS FMS AND *
* DOES ERROR CHECKING. *
*
```

```
RCHR MACRO
IFC 'A','R'
JSR GETCHR
ELSE
LBSR RCHR
ENDIF
ENDM
```

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*
*
* IFC 'A', 'R'
*
* ORG $E00 To get above Disk DOS
*
* EQU'S
*
* TXOUT EQU $B99C OUTPUT TEXT STRING
* TXIN EQU $A390 INPUT TEXT STRING
* TERMBF EQU $02DD TERMINAL INPUT BUFFER
* DFLTDD EQU $095A ADDRESS OF DEFAULT DISK
* DFLTDD EQU $EB DRIVE NUMBER FOR OPEN
* FNBUFF EQU $94C DOS' FILENAME BUFFER
* FTYPE EQU $957 ADDRESS OF FILE TYPE AND FORMAT
* SETOPN EQU $C8A4 OPEN SETUP ROUTINE
* OPEN EQU $C468 OPEN A FILE
* DEVND EQU $6F DEVICE NUMBER ADDRESS
* SCROUT EQU $A38A OUTPUT CHR TO SCREEN
* GETCHR EQU $A176 GET CHARACTER FROM DEVICE
* POLCAT EQU $A1C1 POLL KEYBOARD
* CHROUT EQU $A282
* PUTCHR EQU CHROUT
* FRLEN EQU $97C ADDRESS OF FILENAME LENGTH
* CLOSE EQU $CA53 CLOSE A FILE
* CLOSEM EQU $CA3B CLOSE ALL OPEN FILES
* BLANK EQU $20
* CR EQU $8D CARRIAGE RETURN
* BREAK EQU $03 BREAK KEY
* FNLEN EQU $11 FILENAME LENGTH
* ENDIF
*
* * * * *
*
* -- FLEX System EQUates
*
*
* IFC 'A', 'F'
*
* EQU'S
*
* TXIN EQU $CD18 INPUT TEXT STRING
* OUTADR EQU $CD45 OUTPUT HEX VALUE
* TXOUT EQU $CD1E OUTPUT TEXT STRING
* MEMEND EQU $CC2B END OF MEMORY & BUFFER
* DRNUM EQU $CC0C WORKING DRIVE NUMBER
* FNBUFF EQU $FCB+3
* GETCHR EQU $D406 GET CHR FROM FILE
* INCH2 EQU $CD0C INPUT CHR FROM TERMINAL

```

```

OUTCH2 EQU $CD12 OUTPUT CHR TO TERMINAL
CLOSEM EQU $D403 CLOSE ALL FILES
FMS EQU $D406 FMS CALL
CLOSE EQU FMS
FNLEN EQU $12 FORMATTED FILENAME LENGTH
WARM5 EQU $CD03 RETURN TO FLEX
INCH EQU $CD09 INPUT CHR FROM KEYBOARD
PUTCHR EQU $CD18 OUTPUT CHARACTER
CRLF EQU $CD24 PRINT CR LF
POLCAT EQU $CD4E KEYBOARD STATUS
BFPTR EQU $CC14 INPUT BUFFER POINTER
CHROUT EQU FMS OUTPUT CHR TO FILE
GETFIL EQU $CD2D PARSE FILENAME
SETEXT EQU $CD33 SET DEFAULT EXTENSION
LSTRM EQU $CC11 LAST TERMINATOR
NXTCH EQU $CD27 GET NEXT CHR FROM INPUT BUFFER
RPTERR EQU $CD3F REPORT FILE ERROR
EOL EQU $CC02 COMMAND DELIMITER
CR EQU $8D CARRIAGE RETURN
BLANK EQU $20
ENDIF
*
*
* * * * *
*
* Was a valid System requested
* for Assembly?
*
* IFC 'A', 'R'
* IFC 'A', 'F'
* ERR NOT VALID SYSTEM CODE
* ENDIF
*
*
* If assembly is for FLEX, set the ORG
* at $200 because the FLEX DEBUG
* Program uses Interrupts, which the
* BASIC ROM vectors to the $100 area.
* Can be ORG'd at $00 if
* DEBUG will not be used.
*
* IFC 'A', 'F'
* ORG $0200
* ENDIF
*
*
* LOADER EQU *
*
* If assemble for Radio Shack
*
* IFC 'A', 'R'
* STS BASSTK, PCR SAVE BASIC'S STACK FOR RETURN
* LEAX -50, S MARK END OF BUFFER
* STX MEMEND, PCR
* LEAX BUFFER, PCR ADDRESS OF PROGRAM BUFFER
* STX BUFFAD, PCR
* LEAX MSG1, PCR FILENAME PROMPT
* LBSR INPUTP GET INPUT AND OUTPUT FILENAMES
*
* SET UP TO LOAD MAIN PROGRAM
* LDA #', COMMA
* LBSR INICHR FIND DELIMITER
* PSHS A, X SAVE DELIMITER AND POINTER
* LEAY MODTAB, PCR SET UP TO MOVE FILENAME TO TABLE
* LDY #TERMBF KEYBOARD BUFFER
* LBSR PARSEFN PARSE FILENAME AND MOVE TO TABLE
* LDA #FF MARK END OF TABLE
* STA MODTAB+12, PCR
* PULS A, X GET DELIMITER AND POINTER
* TSTA WAS DELIMITER ZERO?
* BNE LINKR1 GO IF NOT
*
* IF ONLY ONE FILE SPECIFIED, LINKED PROGRAM IS
* COPIED BACK TO MAIN FILE, SO PARSED FILENAME
* IS COPIED BACK TO OUTPUT FILENAME
* LEAY OUTFNM, PCR OUTPUT FILENAME STORE
* LEAX MODTAB, PCR
* LDB #12 MOVE 12 BYTES
* LBSR MOVEM COPY FILENAME
* BRA MAPDSP
*
* PARSE OUTPUT FILENAME AND SAVE
* LINKR1 LEAX 1, X SKIP DELIMITER
* TFR X, Y SAVE POINTER
* LBSR LENSTR COUNT BYTES
* TFR Y, X RESTORE POINTER
* LEAY OUTFNM, PCR ADDRESS OF OUTPUT FILENAME
* LBSR PARSEFN PARSE AND STORE OUTPUT FILENAME
*
* ASK WHERE MAP SHOULD BE DISPLAYED
* MAPDSP LEAX MSG2, PCR PROMPT
* LBSR INPUTP GET INPUT
* CLR DSPDVC, PCR SET SCREEN DEFAULT
* LDA , X GET INPUT
* CMPA #P WAS PRINTER SPECIFIED?
* BNE LOAD GO IF NOT
* LDA #-2 ELSE SET PRINTER
* STA DSPDVC, PCR DEVICE
* LEAX MSG7-1, PCR PRINT TITLE
* STA DEVND
* JSR TXOUT OUTPUT THE TITLE
* LDA #CR FOLLOWED BY 2 CR'S
* JSR CHROUT
* LDA #CR
* JSR CHROUT
* ENDIF
*
* End of Radio Shack portion
*
* If assemble is for FLEX
*
* IFC 'A', 'F' FLEX CODE

```

```

BRA LOADS SKIP VERSION NUMBER
VN FCC 1 VERSION 1
LOADS EQU *
JSR CRLF
LEAX BUFFER, PCR ADDRESS OF BUFFER
STX BUFFAD, PCR FOR COMPARES
LDA DRNUM INITIALIZE DRIVE NUMBER
STA LNKNAM
*
* GET FILENAMES FROM INPUT BUFFER
* LEAX SFCB, PCR FCB
* JSR GETFILE PARSE FILENAME
* LBCS FERR GO IF FILENAME ERROR
* CLRA , BIN EXTENSION
* JSR SETEXT SET DEFAULT EXTENSION
* LEAX SFCB+3, PCR ADDRESS OF PARSED FILENAME
* LEAY MODTAB, PCR MODULE TABLE
* LDB #12 MOVE 12 BYTES
* LBSR MOVEM MOVE NAME TO TABLE
* LDA #FF MARK END OF TABLE
* STA , U
*
* NOW CHECK FOR OUTPUT FILENAME. IF THERE
* IS ONE SPECIFIED PARSE IT AND SAVE IT.
* IF ONE IS NOT SPECIFIED, COPY THE INPUT
* FILENAME, BUT SET THE EXTENSION TO CMD
*
* LDA LSTRM LAST TERMINATOR
* CMPA #CR CARRIAGE RETURN?
* BEQ OUTF GO IF SO
* CMPA EOL COMMAND SEPARATOR?
* BEQ OUTF GO IF SO
* CMPA #BLANK BLANK
* BEQ OUTF GO IF SO
*
* GET OUTPUT FILENAME FROM INPUT BUFFER
* LEAX SFCB, PCR FCB
* JSR GETFIL GET FILENAME
* LDA #2 CMD DEFAULT EXTENSION
* JSR SETEXT SET DEFAULT
* LEAX SFCB+3, PCR ADDRESS OF PARSED FILENAME
* LEAY OUTFNM, PCR STORAGE AREA
* LDB #12 MOVE 12 BYTES
* LBSR MOVEM MOVE NAME TO STORAGE
* BRA LOAD GO START LOAD
* OUTF LEAX MODTAB, PCR COPY INPUT NAME
* OUTF1 LEAY OUTFNM, PCR OUTPUT FILENAME STORAGE
* LDB #9 MOVE 9 BYTES
* LBSR MOVEM GO MOVE IT
* LEAX CMOST, PCR ADDRESS OF 'CMD'
* LDB #3 MOVE 3 BYTES
* LBSR MOVEM MOVE EXTENSION
* ENDIF
*
* End of FLEX portion
*
*
* START LOADING MODULES ON MODTAB LIST. THE FIRST
* MODULE IS THE MAIN MODULE. AFTER EACH MODULE IS
* LOADED, ANY EXTERNAL REFERENCES ARE ADDED TO THE
* END OF THE LIST IF THEY ARE NOT ALREADY ON THE
* LIST
*
* LOAD CLR MODCNT, PCR MAIN MOD FLAG
* LEAX BUFFER, PCR BEGINNING OF PGM BUFFER
* STX LOADD, PCR
* STX RECAD, PCR INITIALIZE RECORD LOAD ADDRESS
* LEAX MODTAB, PCR TABLE INDEX
* STX MODTBP, PCR FIRST ENTRY POINTER
* STX TABEND, PCR LAST ENTRY POINTER
* LOAD1 EQU * START THE LOAD
*
* if Radio Shack
*
* IFC 'A', 'R'
* LBSR CKBK CHECK IF BREAK KEY IS PRESSED
* ENDIF
*
* OPEN THE FILE
*
* if FLEX
*
* IFC 'A', 'F'
* LEAX 1, X SKIP DRIVE NUMBER
* ENDIF
*
* LBSR DSPMOD GO DISPLAY THE MODULE NAME
*
* if FLEX
*
* IFC 'A', 'F'
* LEAX -1, X RESTORE FILENAME POINTER
* ENDIF
*
* if RS
*
* IFC 'A', 'R'
* LDA #1 INPUT FILE
* LDB #1 DEVICE NUMBER
* ELSE
*
* if not, then FLEX
*
* LDA #1 OPEN FOR INPUT
* ENDIF
*
* LBSR SOPEN GO OPEN THE FILE
* CLR RECFL6, PCR 1ST RECORD FLAG
*
* if RS
*
* IFC 'A', 'R'

```



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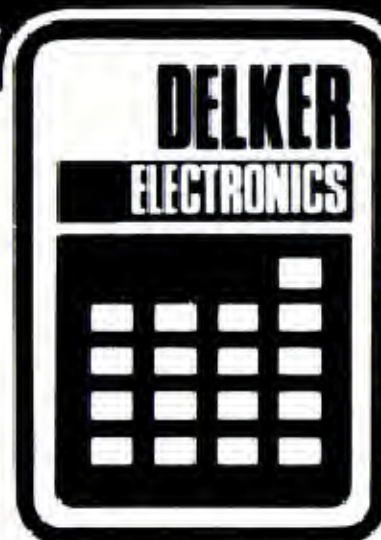
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```

LDB #1 FILE DEVICE NUMBER
STB DEVNO
ENDIF

LOAD2 JSR GETCHR GET FLAG BYTE

* if RS
*
IFC 'A', 'R'
TSTA TEST FOR EOF
LBIT LOADF 60 IF EOF RECORD
RDCHR GET MSB OF RECORD LENGTH
STA --S SAVE
RDCHR LSB
STA 1,S
RDCHR MSB OF LOAD ADDRESS
STA --S
RDCHR LSB
STA 1,S
ELSE

* else, assemble for FLEX
*
BEQ LOAD22 60 IF NO ERROR
LDA 1,X GET ERROR CODE
CMPA #8 EOF
LBEQ LOADF 60 IF SO
LBRA FERR ELSE REPORT ERROR AND ABORT
LOAD22 CMPA #16 TRANSFER ADDRESS RECORD?
LBEQ LOADF 60 IF SO
LEAS -4,S RESERVE SPACE FOR RECORD CONTROL
RDCHR MSB OF LOAD ADDRESS
STA ,S
RDCHR LSB
STA 1,S
CLR 2,S MSB OF LENGTH
RDCHR GET LENGTH
STA 3,S
ENDIF

TST MODCNT,PCR IS IT MAIN?
BNE LOAD3 60 IF NOT
TST RECFL6,PCR 1ST RECORD?
BNE LOAD4 60 IF NOT
* 1ST RECORD OF MAIN MODULE HAS THE SAVED LOAD
* ADDRESS
LDD ,S LOAD ADDRESS
STD PGADD,PCR SAVE FOR OUTPUT LATER
LBSR DSPADD DISPLAY IT
LDD LOADD,PCR MEMORY LOAD ADDRESS
SUBD ,S OFFSET TO ADD TO LOAD ADDRESS
STD OFFSET,PCR FOR STORING SUBSEQUENT RECORDS
STD OFFSET1,PCR FOR DISPLAYING LOAD ADDR. OF MOD
INC RECFL6,PCR SET NOT FIRST TIME FLAG
BRA LOAD4
LOAD3 LDD LOADD,PCR OFFSET FOR SUBROUTINES IS THE
STD OFFSET,PCR LOAD ADDRESS
STD RECADD,PCR INITIALIZE RECORD LOAD ADDRESS
TST RECFL6,PCR IS IT FIRST RECORD?
BNE LOAD4 60 IF NOT
SUBD OFFSET1,PCR DISPLAY EXECUTION LOAD ADDRESS
LBSR DSPADD

```

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```

INC RECFL6,PCR SET NOT FIRST RECORD
LOAD4 EQU *

* if RS
*
IFC 'A', 'R'
LDB #1 UPDATE THE FILE DEVICE NUMBER
STB DEVNO
ELSE

* else FLEX
*
LEAX SFCB,PCR RESTORE FCB ADDRESS
ENDIF

PULS D GET ADDRESS AGAIN
ADD0 OFFSET,PCR ADD OFFSET
STD RECADD,PCR SAVE
TFR D,Y INDEX FOR STORING
PULS D LENGTH
ADD0 RECADD,PCR CALCULATE END ADDRESS
SUBD #1
STD ENDADD,PCR

* if FLEX
*
IFC 'A', 'F'
CMPD MEMEND CHECK OUT OF MEMORY
ELSE

* else, RS
*
CMPD MEMEND,PCR CHECK OUT OF MEMORY
ENDIF

LBHI NOMEM 60 IF OUT OF MEMORY
LOAD5 EQU *
RDCHR GET BYTE
STA ,Y+ SAVE BYTE
CMPY ENDADD,PCR DONE?
BLS LOAD5 LOOP IF NOT
LBRA LOAD2 GET NEXT RECORD
LOAD5 EQU * END OF FILE PROCESSING
LDB #3 OFFSET INTO PREFACE POINTING
* TO END OF MOD
LBSR GETADD GET END OF JUST LOADED MODULE
STX PGTOP,PCR END OF PROGRAM

* if RS
*
IFC 'A', 'R'
TST MODCNT,PCR MAIN MODULE
BNE LOADC 60 IF NOT
LEAX MSG4,PCR CHANGE DISK MESSAGE
LBSR INPUT
ENDIF

* NOW START COPYING ANY EXTERNAL REFERENCES TO THE
* MODULE TABLE

* FIRST CLOSE THE FILE
LOADC EQU *

* if RS
*
IFC 'A', 'R'
LDB #1 REFRESH FILE NUMBER
STB DEVNO
ELSE

* else FLEX
*
LEAX SFCB,PCR FCB
LDB #4 CLOSE FUNCTION
STB ,X STORE IN FCB
ENDIF

JSR CLOSE
LDB #5 OFFSET INTO PREFACE WHICH POINTS
* TO RELATIVE ADDRESS OF MODULE
* NAMES
LBSR GETADD GET ADDRESS OF MODULE NAMES
BEQ LOADN 60 IF NO EXTERNALS NAMED
LOADC1 PSMS X SAVE POINTER
LEAY TEMP,PCR MOVE NAME TO TEMP. FOR COMPARE
LBSR PARSEFN PARSE FILENAME

* SEARCH TABLE TO SEE IF MODULE ALREADY LOADED
LEAY TEMP,PCR ADDRESS OF NAME
LEAX MODTAB,PCR
LDB #12 12 BYTE ENTRIES
LBSR SEARCH SEARCH TABLE
BEQ LOADC2 60 IF ITEM ALREADY IN TABLE

* COPY NAME FROM BUFFER TO TABLE
LDU TABEND,PCR ADDRESS OF END OF TABLE
LEAU 12,U POINT TO NEXT ENTRY
STU TABEND,PCR

* if RS
*
IFC 'A', 'R'
LDX #FNBUFF DOS BUFFER
ELSE

* else FLEX
*
LEAX FNBUFF,PCR DOS BUFFER
ENDIF

LDB #FNLEN MOVE FILENAME
LBSR MOVMEM 60 MOVE FILENAME

```

```

* if RS
*
IFC 'A', 'R'
LDA DFLDD DRIVE NUMBER
STA ,U+
ENDIF

CMPU BUFFAD,PCR TABLE FULL?
LBHS NOTAB 60 IF YES
LEAX LNKNAM,PCR LINKER FILENAME
LDB #12 MOVE 12 BYTES
LBSR MOVMEM MOVE LINKER FILENAME TO END OF TABLE
LDA #FF MARK END OF BUFFER
STA ,U
LOADC2 PULS X RESTORE POINTER TO MODULE'S TABLE
LBSR LENSTR GET POINTER TO NEXT ITEM
LEAX 1,X SKIP MARK
TST ,X TEST FOR END OF TABLE
BEQ LOADC1 60 GET NEXT ITEM

* LOAD NEXT ITEM ON LOAD LIST
*
LOADN INC MODCNT,PCR RESET MAIN MOD FLAG
LDX MODTAB,PCR TABLE INDEX
LEAX 12,X POINT TO NEXT ENTRY
TST ,X END OF TABLE?
BLT BINOUT 60 START OUTPUT IF SO
STX MODTOP,PCR UPDATE POINTER
LDX PGTOP,PCR END OF LAST MODULE
STX LOADD,PCR
LDX MODTOP,PCR POINT TO FILENAME
LBRA LOAD1 START LOADING MODULE

* LAST MODULE LOADED - START OUTPUT
*
BINOUT EQU *

* if RS
*
IFC 'A', 'R'
LBSR CKBRK CHECK IF BREAK KEY IS PRESSED
ENDIF

* MOVE LOAD MAIN'S ADDRESS TO LINKER
LDD LOADD,PCR LINKER'S LOAD ADDRESS
SUBD OFFSET1,PCR ULTIMATE LOAD ADDRESS
PSMS D SAVE
LDD PGADD,PCR MAIN'S LOAD ADDRESS
SUBD ,S OFFSET FROM LINKER TO MAIN
LDX LOADD,PCR LINKER ADDRESS
STD 1,X STORE OFFSET TO MAIN IN LINKER'S PREFACE
PULS X LINKER'S LOAD ADDRESS
LEAX 9,X PGM EXECUTION ADDRESS
STX XADD,PCR SAVE FOR BINARY FILE

* DISPLAY THE TRANSFER ADDRESS
*
LEAX MSG8,PCR 1ST 8 CHARACTERS
LBSR DSPMOD

* if FLEX
*
IFC 'A', 'F'
LDA #BLANK SPACE BETWEEN WORDS
JSR PUTCHR
ENDIF

LEAX MSG8+8,PCR 2ND 8 CHARACTERS
LBSR DSPMOD
LDD XADD,PCR TRANSFER ADDRESS
LBSR DSPADD DISPLAY IT

* DISPLAY THE END ADDRESS
LEAX MSG6,PCR 'END'
LBSR DSPMOD
LDD PGTOP,PCR ADDRESS
SUBD OFFSET1,PCR CALCULATE ULTIMATE LOAD ADDRESS
LBSR DSPADD 60 DISPLAY IT

* COPY FILENAME TO DOS BUFFER
*

* if RS
*
IFC 'A', 'R'
LEAX MSG5,PCR CHANGE DISK MESSAGE
LBSR INPUT
LEAX OUTFN,PCR OUTPUT FILENAME
LDA #0 OUTPUT FILE
LDB #1 FILE DEVICE NUMBER
LDY #200 M/L BINARY FILE TYPE
ELSE

* else for FLEX
*
LEAX OUTFN,PCR NAME OF OUTPUT FILENAME
LDA #2 OPEN FOR OUTPUT
ENDIF

LBSR SOPEN 60 OPEN THE FILE

* SET UP POINTERS, ETC
LDX PGTOP,PCR END OF PROGRAM
CLR ,X LAST MODULE MUST END WITH ZERO

```

Continued next month

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